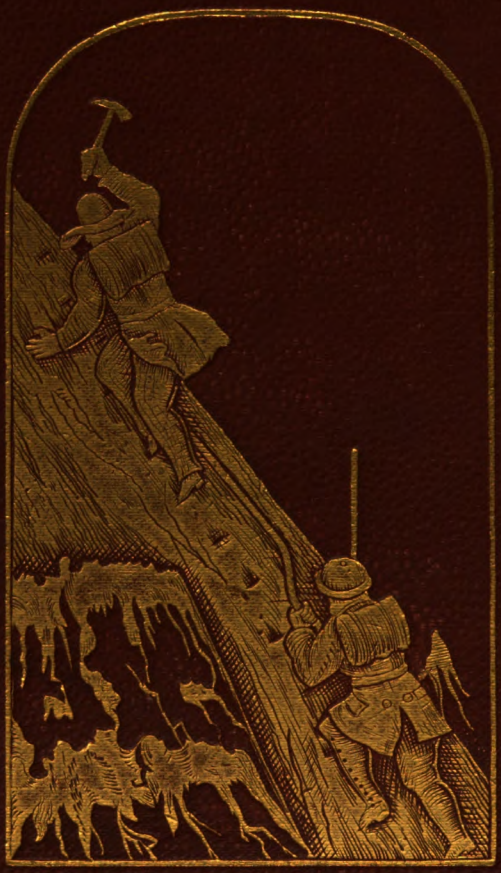

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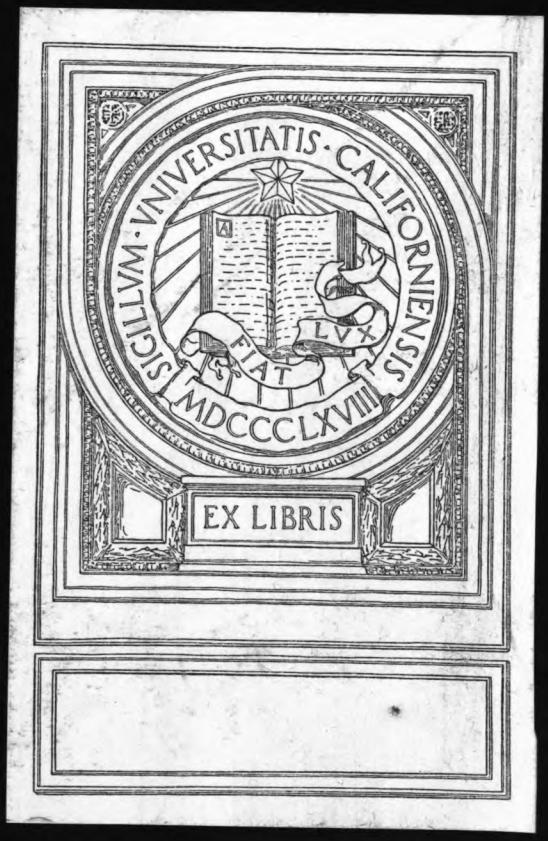

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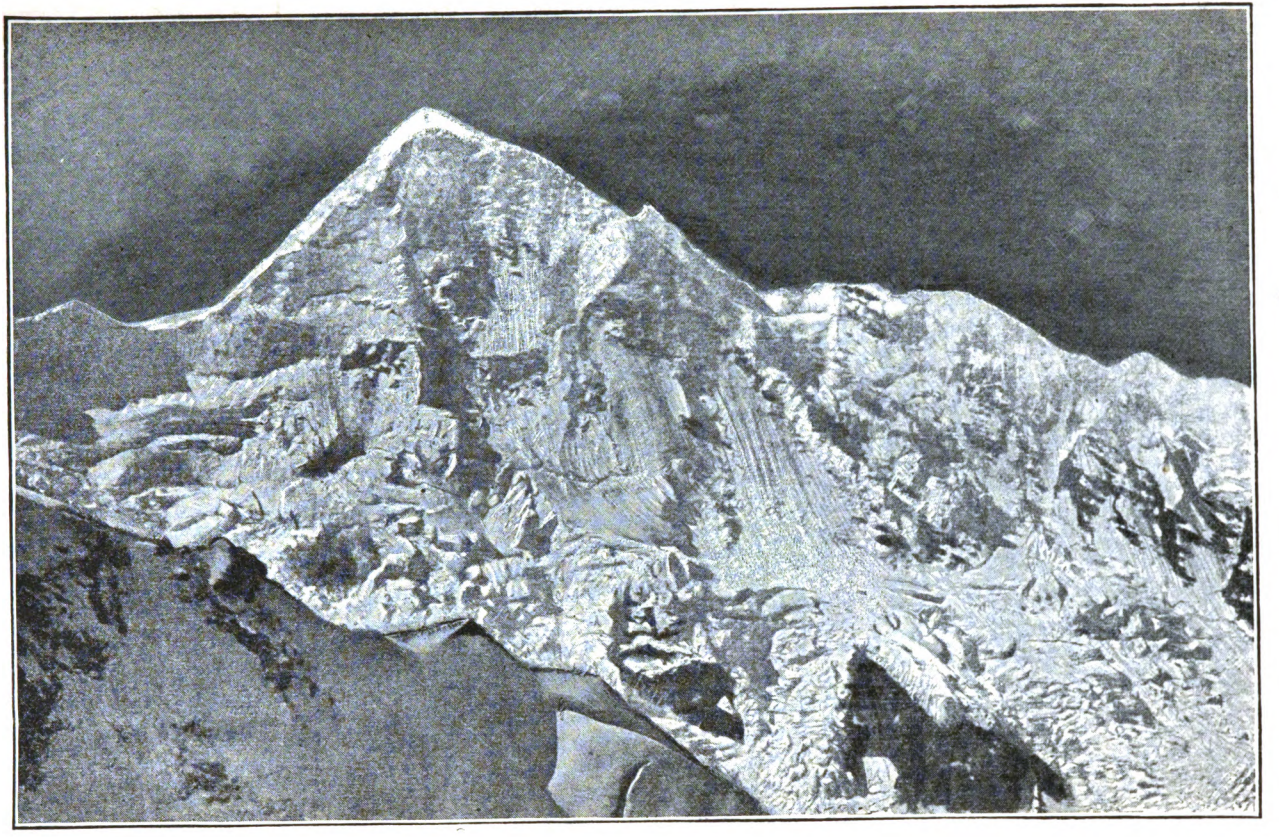

TETNULD

FROM THE WESTERN SHOULDER OF GESTOLA

W. F. Donkin phot. 1886

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THE

ALPINE JOURNAL:

A RECORD OF MOUNTAIN ADVENTURE

AND

SCIENTIFIC OBSERVATION

BY MEMBERS OF THE ALPINE CLUB.

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UNIV. OF CALIFORNIA

THE

ALPINE JOURNAL.

AUGUST 1888.

(No. 101.)

CLIMBS IN THE CAUCASUS.

II.

BY DOUGLAS W. FRESHFIELD.

Nihil hic auribus molestum esse potest, nihil importunum, nulli tumultus aut strepitus urbani, nullæ hominum rixæ. Hic in profundo et religioso quodam silentio ex prærltis montium jugis ipsam ferè cælestium, si quæ est, orbium harmoniam exaudire tibi videberis. . . . Sed lectus, culcitra, plumæ, pulvini desunt. O mollem et effœminatum hominem, omnium instar tibi fœnum erit.—C. GESNER, A.D. 1555.

The Zanner Pass.

OUR second night under the boulder beside the Tetnuld Glacier was less comfortable than the first. The uncertainty as to the morrow, and the whereabouts of our comrades partly, perhaps, interfered with my slumbers; but there was also a physical cause in a cold breeze which poured down from the snowy heights and found its way into the cranny where we were lodged. In place of stargazing overnight I ought to have insisted on the guides raising a low wall to windward! We breakfasted sparely, for we felt bound to husband our provisions, and at about 5 A.M. set off. There was an hour's descent to the junction of the two glaciers. All the water running on the surface of the ice had frozen hard in the night. To keep footing on the slippery surface was almost impossible; one after the other we were on our backs, and our stiffness from the long snow-tramp of the day before threatened to be soon supplemented by more serious bruises. However we reached, none of us much the worse for our tumbles, the rank herbage on the right bank of the Zanner icefall. There was no trace of path among the steep screes and bushes. But it was not many minutes before François detected footmarks. Our doubts were thus happily set at rest. M. de Déchy and the Cossack had succeeded in starting with the troop of porters, and the caravan must be ahead

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of us somewhere on the upper glacier. François, who up to this time had had serious misgivings as to our baggage train being really on the road, was now content, and sagaciously suggested that we need not hurry to overtake it, as we had well deserved to have our steps made for us across the snow-fields. The Chamoniards were all heavily laden, and even at home guides might be excused for feeling a trifle slack if called on to act as porters across the Col du Géant the day after climbing Mont Blanc. François, it must be remembered, is no longer young, and his brother Michel was beginning to suffer—though he stoically concealed his wounds till the following night—from a frost-bitten foot.

It was an hour's steep climb beside the icefall up to the brow overlooking the Eismeer of the Lower Zanner Glacier. Here at 8,500 feet, on a patch of level ground, we found the relics of M. de Déchy's camp. A large boulder had accidentally masked their fire from our view. A few downward steps placed us on the ice we were not to leave for so many hours. But for the moment we were much inspirited. The pure morning sunshine danced through the delicate mountain air. On either hand the pyramids of Tetnuld and Gestola crowned a noble avenue of snowy heights. Mr. Donkin's camera has recorded the fleeting vision he had on reaching the crest of the main chain of the northern face of Tetnuld. This aspect was now before us, foreshortened at first, but displaying as we advanced its full six thousand feet of icy armour. Hardly any rocks showed, and what could be seen were plastered over with the débris of ice avalanches. Here the glistening slopes swelled into an overhanging boss of névé; there smooth riven sheets of snow clung to the wonderfully steep face of the mountain. It was a peak to be proud of!

The glacier, which flowed at first towards us with a south-westerly direction, turned in its upper course more east and west. Far ahead a broad high icefall poured down on the left from the upper basin, over which, as we knew, both from the position of Gestola and from our view from Tetnuld, our pass must lie. For an hour or more I thoroughly enjoyed one of those bits of easy glacier walking which are as amusing to the mountaineer as a cross-country burst is to the foxhunter. Each takes his own line; now the guide in the hollow gets the lead, then he is stopped by some ice-ditches, and his comrade on the moraine forges ahead. One can practise small jumps and gymnastics, or, successful in some 'speculation'—as François disapprovingly calls my short cuts—sit down comfortably on a glacier-table and rejoice in

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the splendour of the shining landscape, until the guides, made more cautious by their loads, come up.

Arrived at the foot of the second icefall we cut a few steps in its lower portion, and then took to the rocks on its right (western) flank. There was no way up them except by crossing slopes of very steep and hard screes, where it was expedient not to slip. Near the top solid crags offered a welcome scramble. Here there were no traces whatever of our caravan's passage, and I was beginning to feel perplexed when a shout from Joseph, who was ahead, told the good news that it was sighted. In a minute I was beside him, looking across a huge smooth glacier basin. Not a mile off a large company were gathered in a circle on the white snow. They were thirteen in number; M. de Déchy, the Kabardan Cossack, and eleven Suanetians. Seen through field-glasses the group bore a singular resemblance to one of the old prints of De Saussure's ascent of Mont Blanc. They returned our hail, and resumed their march. We set off in pursuit, and on this occasion a stern chase did not prove a very long one. The ice was already snow-covered, but not sufficiently so to hinder us materially. In about an hour, at 11 A.M., we caught up the caravan. They had climbed the rocks on the further side of the icefall, which, with the exception of one 'mauvais pas,' they had found quite easy. The Suanetians were all heavily laden, and there was no spare man, as I had hoped, to relieve the guides. We joined greedily in an excellent repast, and then let our troop lead on up the broken slopes of névé, but half transformed into ice, which hid from us a still higher level of these 'shining tablelands.' The Caucasians are as clever as chamois at choosing their line of march, and show a great deal of prudence in sounding in uncertain places. No record of life having been lost in a crevasse exists, so far as I could learn, among the natives. We were soon able to take advantage of some snowy rocks between two branches of the séracs. The snow on them was thick and loose, and made the work exceedingly slow and laborious for those in front. In our happy ignorance we thought this labour was to be the last.

A very fine rock-peak not far short of 15,000 feet, and, as I have good reason to believe, higher than anything between itself and the Ushba group, rose behind us at the N.W. angle of the Upper Zanner glacier. It resembles somewhat the Finsteraarhorn seen on its broad side, and can, I think, certainly be climbed. A pass also may probably be made over the low rock-wall east of it from the Upper Zanner to the Bulungu,

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or eastern branch of the Chegem valley. From the top of the bank we saw in front to the south and east endless snowy undulations. Far, far off at the foot of the long rocky screen that girds in the névé on the north, a piece of bright blue sky was framed by clear, sharp-curving snows. I took its bearings, and hastily noted as best I could the accidents of the intervening ground. For the afternoon vapours were close upon us, and it was not long before they surrounded us.

The snow was now knee-deep where it was best, and thigh-deep where it was worst. The over-laden men could make only the slowest progress. They advanced for five minutes and then sat down for ten. Presently the leader swerved very sharply to the right. Through the double interpretation of M. de Déchy and the Cossack I remonstrated, and we resumed our former direction. Whether this interference of mine was well- or ill-timed I had afterwards reason to doubt, and cannot now tell for certain. The snowfields undulated, the leader seemed to lose his head; instead of keeping a level we occasionally descended. The halts became more frequent, the pace slower, the mists thickened, half-hours and hours slipt by, and still we seemed no nearer the pass. I proposed to the guides that they should take the lead. They declined the labour on the ground of their heavy loads. As I was carrying nothing I went myself to the front for a time, for the crevasses were too thoroughly choked for there to be any danger. Suddenly I became aware that I was alone. Our train was lost to view in the white fog. The next moment strange sounds echoed from the misty heights. I retraced a few steps and found the whole motley troop squatting on a bank of snow and praying at the top of their voices. The Suanetians were all using the same words—possibly a form of prayer for persons in peril on the mountains. The Thibetans we know have a thanksgiving on reaching the summit of a pass. But to what quarter were these prayers addressed—to the powers of nature or to a Christian Deity? All I could get through double interpretation was that our men were calling on the sun. They were as persistent as priests of Baal, and with better success. The mists broke; blue shone above our heads; the rocky screen on the left which was my landmark loomed close at hand. The snowy gap was seen, still some distance in front. Then the long chant turned into howls of triumph—howls not apparently without some such form and order as are found in the ejaculations that make part of a Greek chorus.

We waded and wallowed on across slopes of avalanche

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débris, through snowy corridors. Once more we lost our bearings, and Joseph distinguished himself by being the first to recognise the true direction. The last climb was now before us, a gently-rising snowy dale enclosed between rocks on one hand and high frozen banks on the other. A breeze had sprung up and suddenly lifted the mists. Through the gap in front shone the purest blue sky.

I shall never forget the sight which of a sudden met my eyes, weary of the long monotony of snow and fog, as I first overlooked the crest of the Caucasus. Particular mountain views but seldom come up to the day-dreams imagination and recollection can join to frame for us. This evening view from the Zanner Pass exceeded all my visions, waking or sleeping. Need I add it must altogether evade my attempts at description? Immediately opposite, Koshtantau, a huge rock-peak slashed with glaciers and resting on two massive shoulders, raised to a height of 17,000 feet its crowning ridge. Round its base flowed an enormous glacier, having its secret cradle at the foot of a pile of icy precipices and soaring ridges, the five-crested Shkara. A long line of heights stretched in a mighty impassable wall from Shkara to Gestola, now comparatively close on our right.

It may possibly help some readers to realise the arrangement of the peaks if I suggest that our relation to the surrounding ranges resembled roughly that of a spectator on the Hörnli. Shkara must be put in the place of Monte Rosa; the wall of Djanga will then answer to the Lyskamm, and the Saddle Peak and Gestola may represent the Breithorn and Little Matterhorn. But their cliffs resemble rather those above Macugnaga than the comparatively mild slopes of the northern side of the Monte Rosa chain, and the Gorner Glacier must be extended until it reaches nearly to Randa, and the Matterhorn itself planted on the top of the Gornergrat to play Koshtantau. The parallel breaks down, it will be seen, in detail; and the map after all is the best key to the view, for those who care for one.

It was a wonderful scene and a magical moment.

Evening added colour, variety of expression, and sentiment to a landscape which might have seemed too stern and monotonous in its white noonday magnificence. When we reached the ridge the granite crags and snows were lit up with the slanting rays of the setting sun; cold blue shadows already lay in the hollows at our feet. While we lingered the highest crests flung back the last beams, the peaks flushed red for a few moments, half faded, then glowed

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again in response to the western sky, before they finally sank under the grey pallor of advancing night.

But the hour and the occasion did not allow us to indulge ourselves in any absorption in the wonders round us. It was a time for action—and prompt action. The shades of night were gathering fast about us. When we reached the pass we had already been no less than thirteen hours from our bivouac. We had spent seven hours since we met M. de Déchy and the porters on these interminable snowfields. Doubtless in another season the pass will be crossed in less than half the time. It is not characteristic of the Caucasus that the snow should be out of condition. In July 1868 I found it quite up to the Alpine average of firmness.

Having contemplated hastily the far-off, we turned our attention to the near. We were standing on a frozen wave of snow. At our feet were a cornice, a wall, and a bergschrund; the cornice and the bergschrund were not unmanageable, but the snow-wall interpolated made the combination extremely awkward to attack from above. A guide might, I think, have been lowered by the rope, and then a passage hewn and thrashed out with ice-axes. But it would have cost what was most precious, time; and the Suanetians were understood to swear unanimously that no consideration should induce them to go down alive into such a pit. By five minutes' further ascent to our left it seemed easy to reach a spot where there was no cornice, and whence a rib of rock ran down for full two-thirds of the distance towards the bergschrund. It was much of the character of the once celebrated Strahleck wall; that is perfectly easy to anyone properly shod and accustomed to snow and ice-work.

The Suanetians were all praying, or swearing—it was difficult to say which—on the cornice. One after another peered over, and, drawing back with horror, gave vent to a brief solo, which was followed by a fresh chorus from the whole force of the company. We thought example might be better than precept; so charging our Kabardan Cossack to explain what was to be done next, we started down the rib of rocks. It was steep but perfectly easy, and in ten minutes we were across the bergschrund. But even our example failed to cheer the Suanetians, or to induce them to follow us. They jabbered, they screamed, they gesticulated, they seemed, as is the wont with excited barbarians, on the verge of assaulting one another. They did, in short, everything but what we wanted them to do—come on. At last we were rudely warned that a great resolve had been made by

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receiving one of the tents, which was sent bowling down on us through the soft snow in a perfectly reckless manner. Other baggage, including barometers, followed; and then three of the most daring spirits tied themselves to the Cossack. This spontaneous use of the rope showed that they were not altogether beyond the reach of new ideas! They came down the rocks with the utmost nervousness; clumsily yet safely. But on the steep snow below one of the four missed his footing. A few seconds of headlong descent, some bold bounds in air, in one of which the half-open bergschrund was safely cleared—and the quartette were lying, a panting heap, at our side.

'Voilà donc notre gros, comme il a la mort dans le visage,' said François. A huge Suanetian had blacked his face to save himself from snowblindness; his skin underneath had turned deadly pale with fright, his yellow hair and beard were plastered with the snow in which he was more than half buried.

A good shake, however, showed that no damage was done, and the loss reduced itself to our Cossack's dagger, which had flown out of its sheath and found a lodging in the bergschrund. Fifty years hence possibly it will be disgorged by the glacier, and exhibited as a relic in the reading-room of the Grand Hôtel at the Mishirgi Kosh!

The eight who were still on high were naturally not fortified by the sight of their companions' misadventure. But the sunset wind was, doubtless, getting very cold on the ridge; and, placed between the Scylla of freezing and the Charybdis of the bergschrund, they found at last courage to follow—how slowly and noisily it would be difficult to describe.

The descent of the snow-wall had taken more than an hour. All the time that this screaming farce was being played by our black-faced troop, Nature on her part had been presenting a solemn spectacle. Snows and sky had been alternately flushing and fading as they caught or lost the hues of the sunset or the afterglow. The combination was incongruous in the highest degree. It seemed a rare waste to have two such exceptional performances, appealing to such different moods for appreciation, going on at the same moment. One does not ask for a pantomime in St. Mark's Square, and Christy Minstrels mix badly with Beethoven on the staircases of St. James' Hall!

We hurried across the ice—or rather snow—of a small glacier plateau towards some rocks on its farther or left bank. How came it that we were not descending the large tribu-

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tary of the Bezingi Glacier which runs under Gestola? The map will show that we had not crossed the col at its head (the Adine Col Mr. Donkin names it), but another pass of about the same height farther north, and at the head of the glacier flowing into that last mentioned, the lower end of which my friends traversed on the way to their peak. The two passes are very well shown on one of Mr. Donkin's photographs. The question of course arises, When the porters swerved to the right on the ascent, was their leader, who had crossed more than twenty years before, following his recollections, and making for this alternative pass? At first sight it would seem probable that he was. But, on the other hand, the route we had taken is the more direct; the difficulty of the snow-wall is just such an one as might be created by the shrinkage of the glaciers, which in the Caucasus, as in the Alps, has marked the last quarter of a century. Thus the abandonment of the pass would be accounted for. And on the rocks we were approaching a group of ruinous stonemen and a low wall, signs of ancient camps, were visible. This discovery appears conclusive evidence that we crossed a once frequented pass.*

It was dark when we reached the rocks, though we had been only about half-an-hour crossing the glacier. We proposed to camp at once, but an icy blast was now whistling behind us, and the Suanetians—very judiciously as it proved—insisted on going down farther. Providence had arranged that the dark slope on which we found ourselves should consist not of granite cliffs and boulders but of pulverised schist and snowbeds, in either of which it was equally easy to let oneself slide. In 17 minutes we went down some 1,700 feet, and holloaing so as not to lose one another in the darkness, we all collected on the first patch of tolerably level ground. Lanterns were soon lit, tents unfurled and pitched, soups boiled, pâtés opened, and last, but not least, a bottle of port (purchased at Vladikafkaz) uncorked. I can strongly recommend the Vladikafkaz wine merchant! The Suanetians'

* There can be no doubt whatever that the pass across the chain up the icefall of the Adish Glacier has no existence outside the Five-verst Map. But I think the surveyors were led to insert it by traditions at Adish of people of that village having crossed the chain without descending to Mujal. In the old days when the Zanner Pass was used a party from Adish might have crossed without difficulty the ridge behind the village, and descended by the Tetnuld Glacier to join the Zanner. When the countryside was in arms, village against village, such circuits may have been frequently expedient.

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spirits recovered now that they were safe across the chain. They sang a ballad with a refrain of 'Thamara, Thamara,' in honour of their twelfth-century sovereign; they borrowed our ice-axes and dug themselves holes, and then, wrapping themselves in their *bourcas*, fell fast asleep.

I felt happy and a little vainglorious, like the 'Three Jolly Huntsmen.' Only I had had not one, but two 'rattling days.' I planned with M. de Déchy how next morning we would descend to Dent's camp. Mutton was at hand; bread and letters might be sent for from Bezingi.* The upper glacier should be photographed. Koshtantau I deemed might be climbed; the pass to the Dychsu explored. I looked out from our tent after the moon had risen; there was not a cloud in the sky. Koshtantau towered grandly in shadow opposite; the white cliffs of Djanga caught the light. Our camp was silent, and there was no sound but the distant murmur of waters, or the rattle of stones disturbed by the mountain goats.

Dis aliter visum. When I next opened the tent door at 6 A.M. an ominous scarf of mist lay low in the hollow under Shkara. I remembered that I had left my aneroid on the rocks near the stonemen. Joseph and I strolled up the 50 minutes' ascent to get it. I was determined to lose no moment of the strange scenery, and I had hopes, too, of seeing a wild goat, for the soft soil was everywhere marked by their tracks. Alas! clouds gathered quickly and sleet had begun to fall when we returned to camp. At 8 A.M. the day was hopeless. Grey, wicked mists crept stealthily up below us along the great trench of the Bezingi Glacier. The rain was coming down in torrents. There was nothing for it but to make valleywards. The steep descent of fully 1,500 feet to the level of the great glacier, where we found sheep pasturing, the long tramp down and beside it, the glorious glimpse I snatched of the Mishirgi Glacier next day—on these matters I must not enlarge on my printed Diary.

At this point misfortunes crowded on me. That night Michel exhibited a frost-bitten foot which obviously incapacitated him for serious mountaineering for some weeks to come. François next day showed signs of having, for the moment, exhausted his strength and energy. My companion developed various plans for joint tours in other parts of the

* Naltshik is a post and telegraph station. We owed it to the courtesy of the commandant there that our letters were forwarded by special messenger to Bezingi.

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Caucasus, which were brought to a conclusion only to be within a few hours frustrated by his sudden return home. But my object here is not to dwell on the disappointments and accidents of travel, but to show what was done despite those accidents. Without a bare mention of them my tour might have been thought to have been in all respects favoured by circumstances. This was very far from being the case. Another party, all eager climbers with equally eager guides in a less snowy season, may hope to do much better than we did. I pass on to the 'mountaineering' that remains. There will be quite enough to fill up this article.

The Ascent of Uku.

My next and last excursion with M. de Déchy before he left me was up the grassy glen, called Doumala on the Five-verst Map, opening into the main valley above Bezingi, and leading up to the northern glaciers of Dychtau. By one or the other of these glaciers I hoped to find a way to that peak. One more great peak I had set my heart on climbing. After that I had promised to yield to M. de Déchy's desire, and go with him to the eastern heights of Basardjusi. The scenery of these northern valleys is extraordinarily monotonous, considering their situation at the base of a mighty snowy range. They lie much higher than the Bezingi valley, and are reached by a steep ascent. Where the torrent from what I will call provisionally—for want of knowing better—the Uku glen falls in, a sharp snow-peak is seen for a moment. The horse-path up the main Doumala valley passes several shepherds' koshs or quarters. There are more cattle in this glen than I saw anywhere else in the Caucasus. The pasturages are divided by low stonewalls, and each belongs, as far as I could learn, to a separate group of households. A track from a pass to Balkar falls in on the left. Then the valley, still a grassy trench between bare hills, bends sharply to the south, and snows are seen at its head. About four hours' ride from Bezingi the end of a large glacier comes into view, flowing gently in its lower portion under the base of a fine wall-like range. Its source and Dychtau are still round a corner and out of sight.

We encamped on a flowery plain a few hundred yards from the ice. Next morning we ascended a high moraine and reached the lower level of the glacier. A steep icefall descended from an upper platform surrounded by a horseshoe of cliffs; into this basin poured ice from a recess shut in

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Déchy phot[t]

DYCHTAU FROM THE DOUMALA GLACIER

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between the eastern and northen ridges of Dychtau. As is frequently the case in the Caucasus the difficulty appeared to be, not on the final ridge, but in reaching it. Certain corners were not visible, but there was no practicable route, at any rate no fairly easy route, recognisable. I had hopes that there might be a better way to the lower end of the northern ridge from the second glen, the mouth of which we had passed. Accordingly we rode back to it. After mounting the steep bank at its entrance we saw a sharp peak with a blunt ice-crest on its left. I fancied the sharp peak might be part of Dychtau foreshortened. It was an egregious error of a kind I do not often make, and was the less excusable since neither François nor M. de Déchy shared it. However, I made up my mind stubbornly to climb the peak, whatever it was. M. de Déchy did not care to join me, and rode back to Bezingi, leaving François, his nephew, and myself in the glen with the light tent and what food there was remaining. We left a horse with the shepherds, trusting to pantomime for our future communications with them, and hastened on to the head of the glen. A very steep, short ascent among beautiful mauve primulas, which elsewhere had been past blossom, brought us to a flowery brow most tempting for a camp. We pushed on, however, half an hour further to a little plain, where the streams from two glaciers met at the base of steep rocks, the northern spur of our peak. The height of our camp was at least 9,500 feet. The rugs had been forgotten, and the cold consequently prevented me from sleeping, otherwise we were well off.

About two, as soon as the moon had risen, we started. The ascent of the wall of rocks in the shadow was awkward, but François hit off the right place with curious skill. On their top we escaped into the moonlight. We were on a shelf laden with the most gigantic boulders I have ever scrambled amongst. These were succeeded by steep, hard snow-slopes, where François tested my skill in walking on the edge of my boots. We managed to do without step-cutting, and soon got up to the level of the basin of the western glacier we had seen from below. Lit by the orange sky of dawn it made a beautiful 'snowscape.' A plain level enough for cricket, in which heavy snowfalls had smoothed over every wrinkle, was surrounded by high banks of ice and névé. On our left there was a way up to the northern ridge of our peak—Uku we call it—steep but easy. We cut steps up the frozen slopes, passing between some superb icicle-hung grottoes. Once on the ridge we were

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already high enough to see Elbruz and Kazbek in opposite directions over the intervening mountains. No Dychtau was in sight; for a few moments I still hugged my delusion that we were on his shoulder. There was a large glacier below us on the east, sending its stream to the glen we had camped in; on its further side rose a broad, steep, snowy mountain. The ridge was easy for some way; then it was broken by a great rock-tower. We took to the left hand to turn it. When nearly round we were stopped. A big boulder blocked a gully. I, as the lightest, proposed to get up on Joseph's shoulders, and then hoist up the others. My offer was scornfully rejected by François. However Joseph's attempt on the right failed—at least he found the rocks difficult enough to make me prefer to look elsewhere. I accordingly unroped and scrambled on my own account a dozen paces to the left. There lay the true road. It was not so much a ledge as a great wedge projecting from the side of the cliff. Once lifted on to this wedge it was possible with perfect safety to worm oneself along it for the few necessary yards, and regain the crest above the tower.

Beyond was a slight snowy gap, and then the final peak, steep but not difficult, half snow, half rock, the halves being divided vertically at the ridge. The snow was in shocking condition and perfectly unsafe; so we crossed at once on to the crags of the eastern face. François was out of spirits: he had hardly recovered the two stiff days of Tetnuld and the Zanner, and preferred to wait on the sunny crags. He did not gain much, for he failed to find a perch broad enough to doze on in safety. Joseph and I scrambled on as fast as we could up the peak. There was nothing to stop us, though in places where fresh snow lay about some little care was necessary. The last rocks were the steepest; and then, sooner than we desired—for the broad peak across the glacier still slightly overtopped us—we could go no higher. The ground fell fast and far in every direction. There was no Al Sirat arch to Dychtau. That reluctant maiden was smiling on us over the top of the broad snow screen in perfect safety from any attempts we could make. It is possible, but I think unlikely, that Dychtau might be got at by climbing this screen and passing over its top. I was still angry with myself; but it was impossible to be angry long, the distractions of the view were so many and so marvellous. Our peak, it was clear now, was one of those seen from the foot of the Mishirgi Glacier, for that icefield lay at our feet, and beyond rose a tremendous sweep of cliffs, rising from east

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to west till they culminated in the castellated crest of Koshtantau. I have never seen Monte Rosa from the Pizzo Bianco. The only view of a great mountain in the Alps I know worthy to be compared to that I am describing is the one of Mont Blanc from a little peak too much neglected, the Tour Ronde at the head of the Glacier du Géant.

We saw Gestola, Tetnuld and Ushba across the chain, and of course the gigantic bulk of Elbruz. The long snowy spur between Chegem and the Baksan was admirably displayed: three great glaciers streamed from broad névés, lying at the base of moderate peaks, which I have since learnt from General Shdanov are respectively 14,273 feet, 13,972 feet, and 13,584 feet in height. To the east much of the main chain was hidden by the glacier group N. of the Uruch. The peak I sketched in 1868,* Giuliuch, 14,078 feet, R.S., was conspicuous. Far away Kasbek stood up between two supporters, Gumaran Choch, 15,672 feet, and another.

The view was interesting also in its glimpses of lowlands and valleys. Bezingi itself, with the gorge leading to it, was in sight. Beyond the northern limestone screen, a broken line of long castellated heights, I recognised clearly the far-off hills of Pätigorsk, rising island-like above the rolling steppe.† Away to the east the fertile plain round Vladikafkaz shone in sunshine. Suddenly a white cloud rose from the great precipices opposite, and a prolonged roar broke the silence of the upper air. An ice-cliff was falling in a thousand fragments on to the Bezingi Glacier from the cliffs of Koshtantau.

There were some loose rocks at the southern end of the snow-crest that crowned the peak, to which Joseph retired to build a stoneman. I lingered long over the view; the sunlit snows were so beautiful, the mountain forms so sublime, that it was hard to leave them, perhaps for ever. Far beneath the rivers sprang from their icy cradles, flashed in the depths of their forest-fringed ravines, shone, thin lines of silver, as they wandered out beyond the green foothills into the luminous distances of the northern steppe. Close at hand, and far as the eye could reach, the great peaks of the Caucasus rose like 'whiter islands' into the untrodden sea of air. Before me in its austere and stately splendour and perfect purity was spread one of those great mountain

* *Central Caucasus*, p 411.

† Uku is shown between Dychtau and Koshtantau in my sketch from Pätigorsk made in 1868. See *Central Caucasus*, p. 381. The Koshtantau of the upper sketch on the same page is Shkara.

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landscapes in which the primitive powers of nature, that were centuries before, and shall be centuries after the race of men, seem to assert their independence of our brief consciousness, and at the same time to vindicate the permanence that underlies mutability. One felt for the moment uplifted; brought, as it were, spiritually, as well as materially, to the verge of some strange Promethean prospect. As in a starry night on a desert plain, but more forcibly from the utter strangeness of the spectacle, the mind is at such moments carried away from the accidents of human life and set face to face with the Order of the Universe. It is conscious of the throbbings of an imperfect sense or faculty by which it recognises a spirit kindred to its own underlying Nature. The vision, it is true, soon fails; the veil loses its momentary semi-transparency. But the memory of the sensation remains distinct, when much else is forgotten. How far are such experiences insight? How far idle phantasy? That is a matter in which philosophers must be left to differ, poets to hope, and time to decide.

But 'feet, feelings, must descend the hill,' even though the fall be from the palaces of nature to the hovels of 'cold, insipid, smouchy Tartars.' After a long revel in light and space and splendour I remembered the probable impatience of François, and the certain distance of Bezingi.

Where loose snow lay on the rocks, we had to look carefully to our foothold. But the peak was safe enough for people who knew how to pick their way. We soon rejoined my old comrade, circumvented the tower with the proverbial ease of familiarity, and then varied our descent by a 'new route' to the eastern glacier. This lay down a steep face of snow and rocks. Here and there I found flowers at a height of at least 13,000 feet. The specimens I saved were unluckily lost out of a pocket-book.* The scenery of the glacier was very fine: Uku and the broad peak which I propose to call Mala Tau towered grandly on either side. The ice ended in a horrid wilderness of moraine and rocks and torrents, beneath which our tiny tent gleamed friendlily. We spent but little time in packing it up and shouldering our belongings, and an hour later reached the kosh, whence without difficulty we started a shepherd boy to capture our horse. In due time the animal was caught and laden, and I grieve to con-

* Some were dwarf specimens of a daisy-like blossom (Pyrethrum), found frequently, sometimes white, sometimes purple, at lower elevations.

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fess I added myself at intervals to its load. We pursued steadily the long but easy descent to Bezingi, which we entered at 7 P.M. The chief's son was waiting for us at the guest-house. We cooked our frugal supper. I expressed in some intelligible form an intention to start early on the horses M. de Déchy had ordered for us. Next morning at 4 A.M. I repeated my scanty phrases, and, strange to say, by 6 A.M. we were actually on the road.

Mr. Donkin, owing to the rain which persecuted him, has been unable to say enough of the charms of the little pass over the outer hills to Naltshik. The view from this broad grassy crest of the snows (framed in the cleft of the limestone gorge which forms a gateway to the mountains) is singularly beautiful; and the leagues of rolling foothills, one vast forest, into the recesses of which the path soon plunges, afford a prospect less familiar, if also less attractive to the eyes of a mountaineer. A more characteristic passage to or from the highlands of the Caucasus can hardly be chosen.

Ushkul and the Skenes Skali revisited.

The second portion of my journey was exceedingly pleasant, and in many ways fruitful. To me, who have so long frequented the southern skirts of the Alps, it was very interesting to make acquaintance with the region that answers to them in the Caucasus. The wilderness of the Skenes Skali it had been for years a regret to me to have seen only in cloud and rain. The southern flank of the central group I still knew but imperfectly. All these gaps in my experience I was able to fill up. But, despite glorious weather, I could do but little above the snow level—I travelled more than I climbed.

In truth the limits of time I had set myself were against me. Ten precious days had been lost—I speak as a mountaineer—between that on which I rode down from Bezingi to Naltshik, and that on which I again found myself within touch of the snows at Kalde in Suanetia. In carrying out the round up from Kutais to Suanetia over the Latpari Pass and back by the Upper Rion, I had, provided there were no delays, just two days to spare. One of these I spent in an excursion from Ushkul to the sources of the Ingur. On the way I passed through Jibiani, and had the satisfaction of having the historical barn, where we had so fortunately escaped robbery, if not murder, nineteen years before, pointed out to me as 'the place where three Englishmen had once

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been entertained.' Above the meeting of the glaciers, and opposite the great cliffs of Shkara, lies the Belvedere Alp of the Caucasus. It is a lovely meadow, the nearest to the snows of an army of smooth green hills, unbroken by rock or wood—unless here and there by a slender birch copse—covered by waving flowery grasses, uncropt by herd, unmown by scythe, falling only to the sharp touch of the October frosts. Not altogether unvisited by man, however, for, after wading ankle-deep among untrodden flowers, I found on the brow overlooking the glaciers two stonemen, tapered up with scrupulous nicety—memorials of some wandering herdsman, or altars to the spirit of the mountains? Hardly, I think, the work of surveyors, for here-abouts the Five-verst Map is far astray. Whoever the builder was he proved his taste. The view from this point is superb. The spectator stands as nearly as possible on a level with the glacier basin, out of which rise the great walls and buttresses, heavily draped in hanging ice and snow, that support the five crests of Shkara. To the right extends the snowy ridge that encloses the Nuamquam Glacier. Behind, the ground rises to a low col in the grass ridge that divides the Ingur from the Scena, the western branch of the Skenes Skali. If any attempt should be made on Shkara from this side it must be from the depression (I fear it is inaccessible on the northern side, and therefore no pass) between it and Djanga. But the whole length of the ridge and four peaks would have to be traversed in order to reach the fifth and highest. The proper base for an attack on the mountain is the névé of the Dychsu Glacier. There is no known pass to the north side from Ushkul direct. The watershed may certainly be gained without much difficulty by the spur separating the Ingur and Scena sources. But as far as I can judge from my 1868 sketches, the descent on to the Dychsu Glacier would be by snow- or ice-slopes too steep for Caucasians. Without more time than I could well afford I could not venture to try the peak from a base beyond the great chain.

I was more than repaid for my second visit to the wild glens of the Skenes Skali by the glories of scenery which had been almost entirely veiled from us in 1868 by rain and mists. I know of no view of a snowy mountain from a valley in Alps or Caucasus that equals in romantic grandeur and scenic completeness the view we had of Shkara from the solitary hamlet in the glen of the Scena. The mountain resembled strangely in the shape of its crest Monte Rosa from Macugnaga; but here there was none of the bareness and ugliness of foreground

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which deface the Alpine view. Shkara towered above the green downs, which in their turn melted into forests of the light varied foliage that renews itself every season, birch and beech, alder and plane. From the depths of the defile the pines struck up the hillsides in solid dark columns. On a little plain in the foreground rose the smoke-pillars of half a dozen humble homesteads, raised since my last visit by emigrants from Ushkul. The neighbouring glades had been cleared of their gigantic flowers, and yellowing barley now occupied them. These touches of man's handiwork served to emphasise the scale and vastness of the wild mountain landscape.

Most enjoyable of all our nights out was that we spent in a beech grove above the Zeskhu (the central source of the Skenes Skali), where, after pushing our horses across slopes which no Alpine animal could have traversed with a load in safety, we built an enormous fire, spread our sleeping-bags, and lay luxuriously upon the dead leaves, disturbed only by the alarm—a false alarm it proved—of a bear.

In this part of the chain the glaciers on the southern side are but small, as is shown by the perfect clearness of the water in the Zeskhu and the Skenes Skali.* This arises not from the lowness but from the configuration of the watershed, the névés of which fall to the north in the great glaciers seen from the Stulevesk Pass. The only tiresome part of the route to Gebi is the Noshka Pass. It is short in distance and not high, but the slopes are so steep that to get horses over is a feat not to be lightly undertaken. The western side is the worst. There seems, however, to be a way round through the valleys by which Mr. Phillipps Wolley passed.

The panorama from the grassy height in the centre of the Goribolo ridge is enchanting. Dychtau, Shkara, the crest of Koshtantau, and distant Ushba will here welcome the coming mountaineer. At the head of the Sopchetura, the first tributary of the Rion, I recognised, lying far back, the remarkable summit overhanging the upper Uruch, which I described as Vasmak Khokh,† and which M. de Déchy has photographed as Cigitvashikaia. But the beauty of the landscape lies eastward, where the long mountain spurs fall into the basin of the Rion in a succession of singularly graceful

* At Cholur the Skenes Skali was dark and thick. The turbid water must have come from some tributary in the slate range. The disused pass (Gezivesk of the Five-verst Map) by which the Suanetians used to make raids on the Balkar herds, must have lain at the head of the Zeskhu valley.

† *Central Caucasus*, p. 418.

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curves, and the sunny forests are ringed with peaks running in a semicircle from the snowy dome of Bordjula, through the crowded crests that overhang the Mamisson—the Adai Choch group—to the solitary ice-capped tower of Shoda.

The Ascent of Shoda.

I had gained a day on our 1868 'times' in crossing the Skenes Skali passes. Consequently on reaching Gebi I found I had still forty-eight hours to dispose of. I had to decide whether I should employ them in climbing Bordjula in the main chain (14,083 feet, R.S.), or the outlying Shoda (11,120 feet, R.S.) In so far as it was the greater mountain Bordjula was the more attractive. But, on the other hand, the way to it was the track which I had already followed to the Gurdzivesk pass in 1868, and the ascent of the final peak seemed too straightforward to be interesting as a matter of climbing. Shoda would give an entirely new excursion, and its moderate height was more than compensated for by its position, outside the main chain and completely dominating its immediate neighbours. Moore and I had often talked of it as a desirable expedition. In the end I decided for Shoda.

If the way to the top proved easy to find it was clear that the ascent might be made from Gebi in one day. But we had arrived after sundown, and had to look after all the details that must always be seen to in the Caucasus. We resolved, therefore, to give ourselves the next morning and go up in the afternoon to a bivouac. Thus I hoped to secure time for some solid topographical work on the summit.

Gebi stands 4,200 feet above the sea, in a very picturesque situation, its houses clustered on a knoll commanding the valley. The village green is a scene of constant movement: Mingrelian visitors arriving; Tartars from the north, with their herds and horses, on the way to the markets of Transcaucasia; maidens of the place clad in bright red robes and turbans made of parti-coloured handkerchiefs, fastened over a long white cloth, which falls down the back, and adorned with amber and shell necklaces, gossiping round the fountain, or amusing themselves with songs and dances; smaller children carrying home on wooden platters portions of the ox that had just been slaughtered in the churchyard, and much terrified by large dogs disposed to claim prematurely a share in the feast: such were some of the elements of the shifting groups that passed before our balcony. Many of them stopped to cheer—or jeer—an individual who was

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confined in an enclosure close at hand. We enquired the cause of his detention, and were told that he was expiating at the Starchina's orders the offence of having been 'drunk and disorderly.' It was simply a substitution of the pound for the stocks.

Gebi struck me as having become quite a centre of civilisation since my last visit. The new church, though a plain enough specimen of modern Georgian architecture, gave an air of respectability to the village. The priest talked Russian and addressed me constantly as 'professor.' An influential native desired me to visit a mineral spring hard by, said not to be inferior to the Narzan of Kislovodsk, and suggested I should start a bathing establishment! Here was a gratifying evidence of the march of ideas. Materially, too, we were excellently provided for. Cheese and eggs, beef and fowls, potatoes and vegetables, corn, sugar, and capital wine were to be had for the asking—that is, at moderate prices, and without too much bargaining. Surprises never ceased. A peasant presented himself, who knew at least all about the approaches to our peak, and discussed most intelligently the best way to its summit. Horses were at our disposal whenever wanted, for we had parted on the best of terms with our Jibiani men and their animals.

Yet there was one luxury, as of old, at first unobtainable—any approach to privacy. However, on the second day, either the curiosity of the Gebiites was satisfied, or their harvest labours called them afield, and we were left comparatively to ourselves in the bare but pleasantly situated court-house.

The path to Shoda crosses the Rion and then traverses the cornland on the right bank of the river and the scattered streamlets of the water which descends from the glacier hanging high on the brow of Shoda, which is seen from the village. In place of following the narrow glen from which this stream emerges, we climbed by steep zigzags through a noble beech-wood. Some 2,000 feet above the valley the ascent ended and the track turned a sharp corner into a glen east of Shoda. From the angle there is a splendid view of the great peaks above the source of the Rion,* and of Bordjula immediately opposite. When we had turned our backs to this vista and entered the glen the scenery carried our memories away to the dolomites; beech-woods, craggy peaks, an open meadow, steep slopes dotted by haycocks: we might have been in the Trentino. The shepherds' shelter, luxurious for

* See *Central Caucasus*, p. 237, and *Alpine Journal*, vol. xii. p. 318.

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the Caucasus, a tent-shaped hut of boards well lined with hay, was deserted. The sunset was superb, and from the meadows close at hand the Adai Choch group was splendidly seen. Two peaks were added to those I knew in 1868. One, already seen from the Goribolo, at the back of the double-headed snow-peak, occupied the position where a peak of 15,240 feet is indicated on the Five-verst Map.* It, too, was double-headed, but the tops were mainly rock.

Further to the N.W., somewhere between the Skatykom and Karagam névés, rose a blunt-headed snow-crest which held the sunset last, and must be among the highest. We know as yet but little of the internal structure of this interesting group, for my explorations were confined to the Karagam Glacier, and M. de Déchy had no view from his peak. I hoped to learn a good deal more from the top of Shoda. After sunset a sudden chill south-western breeze sprang up and drove us into the shepherds' hut. We had better have stayed outside. It was the only occasion in the Caucasus when I suffered severely from insects. I had foolishly left below my muslin armour.

In the morning mists, for the first time for many days, were driving about. Still the weather did not look thoroughly broken. By the advice of our porter, who remained below, we went up a very steep grass-slope dotted with haycocks to the level ridge dividing the two glens that fall from the N.W. and N.E. flanks of Shoda towards the Rion valley. The grass gave place to broken crags, and in order to turn the base of a bold spur of the mountain we had to scramble across some steep rock-faces. Above these a tiresome gully—tiresome because it was filled with loose small fragments of shale, which sank under the feet almost as fast as one climbed—led up to the buttress of rock which comes down from the ice, to which on this side it affords the only access. On our right the névé ended in broken cliffs, fragments from which reformed into a small *glacier remanié* far below us under the shadow of a dark precipice. On our left the mountain-side consisted of a curious slope of wet slate lying at a very high angle, as smooth as ice and far more inaccessible. The buttress, however, formed an easy natural path. On its lower portion I found a tuft of hay, obviously part of the stuffing of some hunter's sandal. There were no other traces of previous visitors to the mountain, and none at all on its summit. But, as it requires no ice-

* See plate, *Alpine Journal*, vol. xiii. p. 354.

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craft, there is no reason why it should not have been climbed by Russians or natives. Shortly after we gained the ridge all distant view was lost. We trudged up the slopes of the snow-cap (20 minutes' walk) in grey fog. The top was a long level snow-ridge, resting on its farther southern side on rocks, which afforded shelter from the chill wind. We waited long but vainly. Some skirts of the veil were raised, but only sufficiently to show us the basin of Oni and the steep rough slopes, almost bare of snow, leading down towards the forests of the Radsha. Not a glimpse of the great chain was granted me. It was an ungenerous trick of the weather, for by evening the sky was again cloudless. From its position, absolutely isolated, 1,500 feet higher than anything near it, well thrown out from the main chain, and dominating all the lowlands, Shoda must command a glorious panorama. It occupies a post which may be compared to that of the Dent du Midi in the Alps.

At last we gave up all hope and descended. From the foot of the shale chimney we ran straight down a very steep hillside among streams and white rhododendrons into the head of the glen where our camp was. There was a snowbed, not worthy to be called a glacier—except perhaps in the United States—at its extremity. The flowers grew richly beside the undulating track, which, leaving the stream to fall directly to the Rion, brought us back to the meadow-platform, where our Gebiite was waiting for us. We took afternoon tea, and then sauntered down through the beautiful beech-woods, enjoying from time to time glimpses of the snows opposite, as the perverse mists melted away, one by one, from the peaks of the great chain.*

Next morning we rode to Oni, where we were delayed for horses. A long day's ride took us thence to Khibouli, and a shorter one to Ghelathi and Kutais, where we caught the afternoon train to Batoum.

I must compress what I have to say of the scenery of the Rion valley and of this part of the Caucasian lowlands. The scenery of the Upper Rion is less grand than that of Suanetia; the snowpeaks are less majestic; the mountain

* By taking a straight course up the ridge dividing its two northern glens Shoda may be climbed, I think, in six to seven hours from Gebi. It would be possible to traverse the summit to Oni. The climb from Oni (9,000 feet) would be very long, hot, and tiresome. The peak, though almost snowless on the southern side, is very conspicuous from the lowlands.

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horizons not so wide and varied. Much of the Gebi branch of the valley is defaced by torrents, and the snowy chain is often hidden. But the landscapes near the Rion sources, and in the eastern head of the basin, round Shiora and Gurshavi, are very beautiful. The charm of the Caucasus, the close combination of snows and forests, is nowhere more conspicuous than at the foot of the Mamisson. To Suanetia the scenery of the Rion or Upper Radsha bears a relation similar to that the Oberland bears to the Pennines. The parallel must not be closely pressed; but it may serve to give roughly my impression of the relative scale of the mountains.

The Mamisson Pass, if the road is kept in a carriageable condition—doubtless a great 'if'—will certainly give travellers a glimpse of the character of the Central Caucasus, which at present they do not get from the Dariel and Krestowaja Gora. By this new road Oni will become an easy two days', and Vladikafkaz probably a four-days', drive from Kutais. It will be possible to reach Gebi in two and a half days, though carriages of course will not go beyond the junction of the streams, two hours below that village, where the Mamisson road turns up the eastern tributary.

The scenery of the Rion valley below Oni is not remarkable; at least it would not be thought so on the Italian side of the Alps. The gates or gorges of the stream are picturesque, and have been much admired; but they are short and not to be compared to those of Val Mastalone. Nor are the impending mountains as beautiful in form as those of the Italian slope. The finest piece of scenery on our way down was on the short cut across the hills over the Nakarala chain behind Nikhortsminda. Here, under singularly happy conditions, on a glorious summer evening, I thought the forest that clothes the broad limestone heights, with its stately pines and beeches, its rich undergrowth of rhododendron, box, and laurels, its sky-reflecting pools, and the distant views of the flushed snowy chain and the blue waves of lowlands, one of the most romantic scenes that had ever rewarded my wanderings.*

I slept that evening at a railway inn bearing the sign of the *Gostinitza London*! The coal mines of Khibouli have

* The Skenes Skali valley above Muri is one long romantic defile as far as Cholur. Telfer and Von Thielmann have described at length this road, or I should insist more on its beauty.

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brought a line, which should be open this summer, to the foot of the forest ridge.

The outer limestone range, represented by the Quamli and Nakarala heights, marks the extreme edge of the mountain district. The remainder of the ride to Ghelathi and Kutais lies over undulating foothills. On the ridges, fringed with oak copses and azalea commons, the landscape, spacious and sunny, is illuminated from time to time by distant glimpses of the Suanetian snows, the horn of Tetnuld or the white wall of Shkara and Djanga. The valleys are featureless and tame. In the vicinity of Kutais interest may be found in the hamlets and houses of the old Mingrelian gentry, low one-storeyed dwellings embowered in vines, figs, peaches, and pomegranates. Groups of tall men and comely women sharing their meals under the shelter of the pine and plane, or of orchard trees, bring back to the mind Horatian measures. After this fashion surely must the classical world have enjoyed country delights. But Mingrelia has no poetry. It required the contrast and stimulus of a great capital, 'Fumum et opes strepitumque Romæ,' to create those admirable Alcaics which Eton stamps into the memory even of her dullest pupils.

But the next travellers will care for none of these things! They will take the train. This, I fear, may not be the only result of the new line. How long will it be before the nymph of the Nakarala has to lament the fall of her forests? How long before her tallest pines will be turned into 'sleepers,' or her box-trunks cut up into blocks to suit the purposes of some illustrated newspaper? The best one can wish is that they may, some of them, serve to illustrate the glories of their native heights, to carry back the memories of a few, and to stir the imaginations of many with shadowy outlines of noble scenery. Should these brief papers have in any degree a like influence, should they contribute to the fuller use and enjoyment by Englishmen of the Caucasus, to a revival in the Alpine Club of mountaineering adventure of the old sort—by which I mean the sort that relies on skill and judgment even more than on luck and hardihood—they will not have been written in vain.*

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* See the *Proceedings of the Royal Geographical Society* for June last for a fuller account of Suanetia and its inhabitants, as well as for details as to the construction of the map published herewith. A paper on the *Peaks, Passes, and Glaciers of the Caucasus* will be published in the same Journal in December next.

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Hints for Travellers in the Caucasus and Elsewhere.

Nomenclature.—The nomenclature of peaks is always a difficulty. The same difficulties arise in all countries. In the first place the mountain-people often speak a different dialect, or a different language, from the surveyors or travellers. Again, unless in the case of very prominent or isolated peaks, they frequently do not give a distinctive name to the individual summits. Or if a peak is conspicuous from two valleys it has two names, one of which has to be preferred. Sometimes a whole chain is named from the pasturage at its base, or from the valley that runs along it. This seems to be the case with the chain dividing Chegem and the Adyrsu, where three peaks are in the map described as Adyrsutau 1, 2, and 3. In such cases, when the hunters of the locality, generally the only authorities, can give or agree on no name, a peak may fairly be called after the glen or pasture nearest it, and from which it is best seen. Again, where a peak has two names, the one given to it on the side from which it is most seen should prevail; for instance, *Ushba* will be better than any Tartar name (if there is one) for that peak. A name given to a *massif* may always fairly be applied to its loftiest point, as was done in the Alps in the case of Monte Rosa and Piz Bernina. Where no local name is forthcoming, a name may suitably be found in some characteristic of the peak. One main point to keep in view is that the Government Survey is, or ought to be, the final authority, and that, when its decisions have to be altered, much literary and practical inconvenience is caused.

Geology.—Apart from their primary objects, mountaineers may find opportunities far exceeding those of the ordinary tourist for observing and collecting facts and specimens illustrating the nature and products of their field of work. *E.g.* They may collect (carefully labelling in each case the height and position from which they are taken) specimens of rocks, particularly of the highest rocks among the snowfields. Bits of the prevailing rock (not crystal and spar, which look pretty) are most useful. They should, as a rule, be broken off *in situ*, and not taken from moraines. But a collection of stones from the terminal moraine of a glacier, specified as such, will be valuable as showing roughly the geological structure of the ranges forming the glacier's basin.

Mineral springs, hot springs, and their temperature where they issue from the ground may be profitably noted, together with any evidences of volcanic action, recent or ancient.

Glaciation, &c.—The snow-line and timber-line (that is, the upper limit of forests) should be noted, and their variations according to rainfall, exposure, prevailing winds, &c. The heights of the lower ends of glaciers should be observed, and marks (with a date) placed on the rocks showing the exact present position of the end of the ice, so that its future movement of advance or retreat can be ascertained. Erratic boulders should be reported on, and unmistakable ancient moraines; rock surfaces scraped and polished by ice (*roches moutonnées*) are also worth notice, though less positively recognisable.

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Botany and Natural History.—Rare specimens of the flora, particularly from the *highest* rocks, should be taken. Flowers grow at an extraordinary height (over 13,000 feet) north of the Caucasian chain among the snows on exposed rocks. Bulbs or seeds of any unusual species should be obtained whenever possible. Any uncommon objects in natural history (entomological, &c.) may of course profitably be collected.

Photography.—Photography is invaluable in the Caucasus, not only for topographical delineation, but also for obtaining types of the population, their dwellings, domestic furniture, antiquities, monuments, &c.

Anthropology.—Measurements of natives, made according to the principles set out in the Royal Geographical Society's 'Hints to Travellers,' p. 222, would be valuable.

Local Traditions, &c.—An interpreter of intelligence may aid in collecting evidence of old customs, religious or legal; forms of worship and modes of tenure of property. Also by copying down local ballads and traditions. In the Caucasus at this moment there is an opportunity in this respect which will be lost as civilisation and schools spread. Old burial-grounds, specially those where ancient objects have been found, should be noted.

Instruments.—Information as to instruments and instruction in their use may be obtained from the Map Curator of the Royal Geographical Society at 1 Savile Row on any day (except Saturdays) between 10.30 A.M. and 5 P.M. D. W. F.

Three New Ascents in the Bernese Oberland.

By H. SEYMOUR KING.

(Read before the Alpine Club, May 1, 1888.)

WRITING a paper nowadays for the Alpine Club has become strangely akin to the task of the children of Israel in Egypt, and consists largely, I fear, of making bricks without straw.

The Alps have been so thoroughly explored by our predecessors, that only here and there the tiniest scrap of stubble remains ungarnered. A few years ago the humble adventures I have to narrate this evening would have been crowded out by papers relating doughty deeds of daring. But the necessity of providing the monthly paper for consumption by the Club, coupled with the decreasing number of Alpine ascents which by any stretch of words can be called *new*, has driven the Secretary to request me to fill up a gap to-night with a short account of three excursions I made last year, and to inflict upon you what I fear can only be considered a tale of very trivial adventure. At the same time it may be noteworthy, as showing that the Alps are

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not yet so utterly exhausted as some members of the Club would have us believe, that there should have been two peaks, even though of a humble character, under the very eyes of every traveller from Meiringen to Grindelwald, which until last year had remained neglected, and indeed, so far as I have been able to ascertain, unascended; and I confess that no one could have been more surprised than myself at finding this out.

No one who has visited Rosenlaui can have failed to be struck by the bare, rugged, and precipitous character of the Engelhörner, and yet I can find record of only one of their peaks—true it is the highest, that marked 'Engelhorn, 2783' on the Federal map—ever having been ascended. It was certainly without a thought of making a new ascent that we first essayed the highest of the four peaks of the Engelhörner which crown the end of the ridge separating the Ochsenthal from the basin of the Rosenlaui glacier, and are conspicuous from the valley.

Everybody in this room must be familiar with the wonderful amphitheatre which discloses itself to view as the traveller descends from the Scheideck to Rosenlaui, and must have looked with admiration on the bare rugged wall of precipices which shut it in on the left.

I had gone to Rosenlaui at the beginning of August last year straight from England with the intention of getting into training a little, before attempting any of the severer expeditions in the Oberland. On the first day after our arrival we went for a walk to the Dossen hut across the Rosenlaui glacier. The precipitous walls of grey limestone on our left naturally attracted our attention, and we amused ourselves, as we walked, speculating on the best way to the summit. It never entered our heads that peaks so near to the track from Meiringen to Grindelwald could have remained unclimbed.

Careful examination with the glass led us to the conclusion that the route to the summit probably lay on the other side, and that the ascent would have to be made from the little valley which lies between the Engelhörner and the Jägiburg, and is known to the inhabitants as the Ochsenthal.

We decided to make some inquiries, and see if it were possible to find any one who could point out the way. It struck me as an expedition well suited to my then state of decrepitude, and not likely to prove either long or severe. Inquiries at the hotel, however, proved fruitless; one old man said he thought there was a way leading up from the

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Ochsenthal, and, as people are always rather inclined to believe those who agree with them, we came to the conclusion that probably the old man was right. The more general opinion, however, was that hitherto no one had succeeded in reaching the summit marked 2626 (8,616 feet) on the Federal map, on which our affections were set; and, although we could hardly believe that this was likely to prove true, it did not tend to decrease our desire to make an attempt. So early next morning we started off through the woods to the glacier, following the usual path, until we reached the little ruined chalet at its foot. Here we turned up through the woods, and leaving the track to the Dossen hut just beyond where it crosses a stream, and then taking to the alp on our left, pushed upwards to the little col which lies at the extreme northerly end of the ridge, our intention being to pass over it into the Ochsenthal, whence we hoped to find a way to the summit.

There is no difficulty about reaching the col, but we found to our dismay that the rocks leading down to the Ochsenthal were as steep, if not steeper, than those on the Rosenlaui side, and it was only possible to descend them a very little way; then the end came in a sheer precipitous drop into the valley. It was obvious there was no way up on that side, and an attempt to climb along the ridge was very quickly defeated. The rest of the day was spent in exploring along the base of the rocks, and though we discovered a way that ultimately proved practicable, it was not until it was too late in the afternoon for me to reach the summit; indeed, I must confess to have been so dead beat as to have been utterly unable to make the ascent, however much time I had had on hand. A few days' exercise, however, put that right, and a week later we made a second attempt on the peak.

Let me first recall to your memory a little more in detail the aspect of the northern end of the crest Engelhörner from Rosenlaui. It shows four peaks, the highest (8,616 feet) being the most southerly, that is, the one most to the right as you stand facing the ridge, and the lowest at the extreme left, or northerly end. Between the highest and the central peaks there is a deep gap leading into the Ochsenthal: the two central peaks are connected by a ridge slightly depressed in the middle, and then between the lower of these two central peaks and the most northerly one is the col which I have mentioned. I must ask you to try and bear this description in mind, if you are to under-

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stand our subsequent movements. From the further of the two central peaks, the one, that is, on the right as you face the Engelhörner, a spur of rock runs down towards the valley, very precipitous, very steep, and very narrow, between which and the ridge on which the highest peak is situated is a narrow couloir, the rock floor of which has been worn by the action of water so smooth that it would have been impossible to take three steps on it without slipping. On the second occasion we followed the same route as at first, until we came to a point about 500 feet below the col to which we had first climbed. Striking across the face of the alp at this point we made our way up an easy couloir to the foot of the spur I have just described. The side of this ridge facing us was uncommonly like a steep, high-pitched, sloping roof of slate, and at first sight was by no means inviting. A closer view, however, showed that the surface had broken away here and there, leaving a few cracks, running sometimes vertically, sometimes horizontally across its surface, and by the aid of these we managed to worm our way in a devious fashion up the slope until we reached the arête. We crossed now to the other side, and found no great difficulty in skirting the rock couloir I have before mentioned, and making our way to the gap lying between the highest and the central peak.

Up to now it had been comparatively plain sailing, and we halted for breakfast. One of the chief difficulties—the smooth rock couloir—had been circumvented, and we felt pretty certain of reaching the summit. Leaving the col, we ascended towards the final arête, working to the right until we came under a sort of chimney or couloir of a very stiff and uncompromising character; the rocks were very rotten, and extremely steep; Supersax, however, was in good form, and after a hard climb we finally reached the arête. From here to the summit was a distance of only about two hundred feet, but it was not easy. The ridge is very narrow, and the rocks are even steeper on the further side than on that by which we had ascended. On the top no cairn or any evidence of a previous visitor could be discovered, and we occupied our time in building two large stonemen. We left our names in a wooden match-box, the only receptacle we could find, having left all the knapsacks far below.

The ascent had occupied from Rosenlaui four and a half hours, of which about two and a half were consumed in actual rock-climbing; the descent of the rocks occupied an hour and a half.

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The climb is a decidedly interesting one, and it is not easy to find the way. There are people, I believe, in the Club who, like the law, *de minimis non curant*; but to those who appreciate a good climb, even if the peak be under 9,000 feet, I can confidently recommend a scramble on the Engelhörner from Rosenlaui.

If it had been a surprise to find that one of the principal peaks of the Engelhörner had not been ascended, I was still more astonished when Emil Boss pointed out to me one day from the hotel steps at Grindelwald the Eigerhörnli (8,878 feet), and stated that it was still virgin, no one having ever seriously attempted it. Anthamatten, who had been with us on the Engelhörner, had left to keep another engagement, and his place was well filled by Louis Zurbrücken, and both he and Supersax were highly delighted at the chance of adding another feather to their cap from the Oberland.

Leaving Grindelwald early one morning at four o'clock, we followed the path to Alpiglen, and shortly before reaching the hotel there, turned off across the alp and made for the ridge of rock which is so conspicuous from the hotel, running down from the Mitteleggi by the side of a hanging glacier. Ascending by its side nearly to the point marked 2575 on the map, we then turned to the left and traversed the face of the mountain until we came to the foot of the buttress of rock which forms an outwork of the Eigerhörnli. Here we put on the rope, and, surmounting some difficult pieces of rock, found ourselves at the foot of a long couloir of a most forbidding appearance. It was then about ten o'clock, and not liking the look of the couloir we spent some considerable time in casting about for some other means of reaching the summit. The rocks were of an extremely smooth character, and our efforts in various directions proving fruitless, we at last reluctantly committed ourselves to the slippery dangers of the couloir.

It was one of those uncomfortable couloirs that have the habit of constantly swelling outwards and throwing you off your centre of gravity; it was very narrow, and at its summit was a large patch of snow, the melting of which caused a permanent trickling over the rocks, rendering them additionally slippery, and causing us great discomfort by running down our necks and arms. This was undoubtedly the most difficult part of the ascent, and occupied us over an hour and a half. It was half-past twelve before we emerged from the couloir, and after the severe exercise we had been going through we were glad of a rest.

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After some lunch, and a pipe, we climbed without much further difficulty to the arête, and keeping just under it, made our way to the summit.

There is on every smooth rock-face to cross, but a large stone, like a milestone, has been providentially placed where the climber may easily fasten a rope, held by which he will have no difficulty in reaching the base of the final peak. Here let me say I would decidedly advise those who follow us to take a second rope with them. We reached the summit at two o'clock, and only stayed long enough to build the traditional cairn.

The descent of the couloir proved a real 'stumper,' as it was very hard for the last man to avoid seriously damaging his predecessors with stones. The descent occupied us a very long time, and it was five o'clock before we got to the bottom. Ambrose had dropped his axe, and when we recovered it the handle was found to be broken. A thick mist was sweeping up from the valley, threatening to engulf us every minute, and it was evident we must hurry on if we were to get back to Grindelwald that night. Just as we reached the rock-face where it had first been necessary to put on the rope, the mist finally descended upon us, and it was with the greatest difficulty that we were able in the dark to find our way down it. The last man only succeeded in descending by fixing Ambrose's broken axe in a crevice and running the rope round it. Unfortunately, the rope got stuck, and we could not dislodge it. The night was upon us, and we could not see where our path of the morning lay, and after vainly attempting to find some shelter were obliged to sit down on the rocks and wait for the dawn.

Soon the mist turned to rain, and from seven until three it rained on and off all night. It was half-past four before there was light enough to move, and we then were drenched, stiff, and dispirited, and so, without going back to fetch the rope, we made our way, as quickly as our stiff legs would carry us, down to Grindelwald. Fortunately, the night had been fairly warm, and we got off with no worse consequences than very bad colds. Mr. J. Wills and his brother, with one guide, repeated the ascent a few days afterwards, sleeping the previous evening at the hotel at Alpiglen. They reached the summit in six hours from that place, and brought back with them our rope and Ambrose's ice axe. I should hope that this may become a favourite expedition from Grindelwald, being one of the few that can be made

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within the compass of a day from the hotel, and it certainly gives opportunities for as fine rock-climbing as any peak among its more pretentious brethren in the neighbourhood.

A few days later we went to Mürren, with the intention of carrying out a long-cherished plan of mine and testing the possibility of ascending the Silberhorn from the Roththal. Previous ascents had proved so lengthy, necessitating, I think, in nearly every case, the passing of a night on the rocks or the glacier, that I thought it would be highly desirable if some shorter route could be discovered. I had an idea that the route by the western arête would prove to be the one sought for. Unfortunately, we were delayed in making an attempt by bad weather until the 23rd of September, which is undoubtedly too late in the year for so difficult an expedition.

I left the Hôtel Silberhorn, with Ambrose Supersax and Louis Zurbrücken as guides and a porter, at ten o'clock on the morning of the 23rd of September, and followed for some distance the usual path to the Jungfrau hut; at length leaving the Roththal path on the right, we struck off into a goat track which leads by narrow ledges round the shoulder of the great bluffs forming the northern boundary of the Roththal. In this way gaining the face of the alp fronting Mürren, we made our way to the base of the 'Strahlplatten,' where we had determined to encamp for the night.

The nights were already lengthening out, and where we were it was not light before six, and it was not possible to move earlier than five; punctually at that hour we started. We took only one knapsack with us, leaving the rest of the things with the porter, whom we instructed to stay where he was until he saw whether we were going to return the same way or not, as we thought it was quite possible we might have to pass another night at the same place. We therefore arranged with him that when we got to a certain point on the ridge, if we intended to return, we would wave our hats; but if we made no sign, he might pack up his things and go home, as in that case he might understand that we had determined either to descend from the Silberhorn across the glacier to the Wengern Alp, or else make our way over the Jungfrau, and pass the night in the Bergli hut.

Now, let me try for a moment to describe the appearance of the rock face up which we purposed making our way on to the arête. From where we were the arête appeared to run nearly due east and west. At the west it terminated in

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the precipices which face Mürren; and at the east with the peak whence we had arranged to signal to our porter. From this peak a ridge descended towards the valley bounding the side facing us. On that side the rock face itself was divided into two compartments by a well-marked ridge running down the middle, giving the appearance of two couloirs leading to the arête; the whole side was composed of extremely smooth rocks, with very little foothold or handhold, which would be extremely dangerous, if not impossible, to attempt if they were not dry. Fortunately, we found them perfectly free from either water or ice, and, with the exception of one difficult piece which it took us some little time to surmount, we found nothing to check us until we were just under the arête. We ascended by the right-hand couloir, if I may so term it, and then made for the gap on the ridge at the extreme westerly end. Just below this gap we experienced some difficulty, owing to the excessive smoothness of the rocks, but finally reached the gap I have mentioned a little before nine.

I need not say that our hopes rose high, and that we were in the very best of spirits, and when we finally stood in the gap itself we began to think the worst part of the work was over. We soon found, however, that it had hardly begun; it was all very well being in the gap, but the problem was how to get from there on to the arête itself; for, though the latter was not more than twenty feet above us, the peculiar formation of the rocks rendered every attempt to get on to it fruitless. The rocks hung over on every side. We exhausted ourselves in vain attempts to surmount them. An hour soon passed away, and after each of us in turn had failed, we sat down disconsolately to consider the situation under the lee of the ridge, so as to be out of the way of the biting north wind which was blowing. Looking round as we sat mournfully consuming some breakfast, I spied a bottle in a crevice, and found it contained the names of Mr. C. E. Mathews and Herr E. von Fellenberg, with Melchior Anderegg and two other guides; it was undated, but recounted how they had reached this spot, and had been obliged to return without achieving their object, which apparently was identical with our own.* This was the last straw, and exasperated Ambrose to the highest degree. That we should have gone through so much only to have gained the same spot where another party several years before had arrived was too much

* See Note at end of the paper.

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for his equanimity. He vowed he would never go back, and nothing under heaven should turn him back, he would get on to the ridge. We might do as we liked, he meant to stay there until he had. All of which I pointed out to him was very fine talk, but, as men were at present constructed, it did not appear to me possible to climb an acute angle. Ambrose, however, persisted that he would make another attempt to get on to the ridge, and, as it was quite hopeless anywhere on the side by which we had ascended, he roped himself, and insisted on being let down the northern face of the mountain.

With great skill he managed to work himself along the face for the full length of the rope, and the first 100 feet being exhausted, a second of eighty feet was tied to it, and this again paid out to its utmost length; still he could find no way up to the ridge. He thereupon demanded that the rope should be let go, and, in spite of our remonstrances at the danger he was running, he pulled it in, slung it on his back, and proceeded, while we sat down and waited with no little anxiety lest some accident should befall him.

For half an hour we neither saw nor heard anything of him, and our shouts remained unanswered. Zurbrücken muttered at intervals something about 'Dummheit,' and was evidently very uneasy. Suddenly we heard a shout from above, which told us he had succeeded in ascending the wall above him, and getting on to the ridge, down which he was actually coming at the moment, and the next minute he was peering over the point where we had been stuck.

It was really a magnificent exhibition both of pluck and skill, and Ambrose deserves the highest credit for his success. Letting the rope over, and fastening it well to a piece of rock, he first hauled up the ice axes and knapsack, and then we each in turn were half hauled, and half climbed to the place where he stood. I know when I arrived at the top I was nearly speechless from the terrible exertion it was necessary to make, and the pressure of the rope on my ribs; I could only lie on my back and gasp feebly for brandy!

However, it was imperative to proceed; more than two hours had been wasted here, and it was nearly eleven o'clock. The way in front of us looked fairly plain and easy, and our hopes once again began to rise; but soon, as we proceeded along the ridge, it became narrower and narrower, until from walking we were reduced to kneeling, and at last could only proceed *à cheval*; in this elegant position we struggled along for some little distance until the arête widening out again

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permitted us once more to stand up ; but here we found the rocks much more difficult, and finally absolutely impossible. At the foot of the peak at the easterly end of the ridge which I have before mentioned we were forced off the arête on to a wall of ice which led to the summit ; the slope was at a very sharp angle, the ice very hard and blue, and at last became so steep that we were forced back on to the rocks, and with some considerable difficulty reached the summit : from there we could see the Silberhorn in front of us jutting out like a great white promontory into a frozen sea. It being then one o'clock, we saw there was no possibility of our getting back the same way that evening, so we made no sign to our porter, whom we could see watching us far down below.

The formation of the ridge here is somewhat curious. After a slight descent it broadens out into a small and much crevassed glacier, shut in on the further side by a level snow wall, the promontory which I have mentioned above. The arête of this wall appears to run level from the rock ridge to its northern termination ; indeed, I am of opinion that the highest point is on the rock ridge itself, and that the extreme end of the ridge facing the Wengern Alp is a few feet lower than the rocks overlooking the Roththal.

We speedily crossed the little intervening glacier, or snow field, and commenced to ascend diagonally the snow wall, but found the snow in such a dangerous condition, lying as it was loosely on the surface of ice, that from the fear of starting an avalanche we once more made our way back to the ridge which formed the continuation of the arête along which we had been climbing. Here the rocks were extremely difficult, being interspersed with ice, and very rotten. I think this was one of the most difficult parts of the expedition. It was half-past three when we reached the final summit, and then made our way along the snow ridge nearly to its extremity. The snow arête was very narrow, and in its then condition not very pleasant to traverse; the day too was far advanced, and we had no time to spend in much exploration ; so we returned as quickly as we could to the ridge which leads down to the Silberlücke : we were already getting very doubtful as to whether we should get any shelter for the night. We had reached the narrow rock arête joining the Silberhorn with the precipices of the Jungfrau; in the middle was the narrow gap called the Silberlücke, and to that we crawled down and halted a moment to consider whether it would not be better to descend on to the glacier

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and strike across to the Wengern Alp; but we knew from the results of previous expeditions that crossing the glacier would probably take four, if not five, hours. None of us had ever been across it; it was then four o'clock, and it would be dark at six. Our only hope lay in getting across the Jungfrau before the daylight finally died out. In the gap we found a ladder left by some previous explorer, and two or three pieces of wood; and after debating whether we had not better pass the night there, finally decided to push on for the Jungfrau.

Our chance of escaping a night in the open air depended mainly on two points: first, whether the snow leading up to the Jungfrau was in fairly good condition; and, secondly, whether anybody whose steps we could make use of for descending had been on the mountain that day. A few minutes settled the first question: we found that the slopes leading up to the upper snowfield which circles round the base of the Jungfrau were hard as ice, and we were soon laboriously cutting steps upwards. We pushed on with all speed, but step-cutting is at the best a slow operation, and before we got into the Roththal track the lengthening shadows had almost overtaken us. We hurried on and managed to get across the bergschrund before the last rays of sunlight left the summit of the Jungfrau. As we surmounted the final rocks I turned for a minute to look across Switzerland, and was rewarded by one of the most beautiful spectacles it has ever been my good fortune to witness. The valleys were filled with mist, but the setting sun tinged their surface with a deep crimson glow; the last rays were still lingering round Mont Blanc and one or two of the higher mountains; where we stood was still filled with golden light from the last rays of the sinking sun. The sky was perfectly clear, and the panorama which unrolled itself before our eyes with its mingled light and shadow was one of the most wonderful that a lover of mountain scenery could desire to gaze on. A justification for the erection of a hut on the summit of the Jungfrau might almost be found in the possibility of obtaining such a view.

But we had no time for indulging in rhapsodies; a bitter north wind was still blowing so keenly, that the upper leathers of our boots had frozen stiff as boards while we walked. The moon was well up, and if only our second hope were realised, and some one had been on the mountain that day, we might find a refuge from the wind in the Bergli or Concordia huts. We tumbled rather than scrambled down

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the rocks by the flickering moonlight, until we reached the well-known point where it is necessary to strike across the face just above the Roththal Sattel. Our last hope was dashed to the ground! No one had been there that day; and if we were to get down, it must be by our own efforts. So Ambrose at once set to work to cut steps across the face. We had been there a fortnight before, and gone up and down the Jungfrau without cutting hardly a step; now the face was all blue ice, and in five minutes I made up my mind that the risk of such a descent was too much to take.

The wall above the great bergschrund was in shadow, the bergschrund last year was especially formidable, and we were all too exhausted safely to face the freezing wind on such a steep ice slope in the dark. We returned, therefore, to the rocks, and, after a brief consultation, decided to pass the night there as best we could. We managed to find a corner shut in on two sides by rock about five feet high, from the floor of which we set to work to rake out the snow with our axes. The snow had drifted to a considerable depth, and its excavation gave us a good quantity of heat to start the night with, but our boots refused to thaw, and do what we would our feet would not get warm.

Our provisions being nearly exhausted, we agreed only to take a mouthful of brandy and a little bread that night, and keep the bulk of the provisions until next morning, when we expected to be in a more or less exhausted condition, as the cold was very great, and it was obvious that we had a pretty severe ordeal before us. It was by this time half-past seven o'clock. We put on our gloves and gaiters, buttoned up our coats, and after making a seat apiece out of three smooth stones, sat down as close together as we could, and commenced to smoke.

The night was beautifully clear, but far away to the south we could see a great thunderstorm raging over the Italian hills, and were in no little trepidation lest it should be coming up in our direction, as indeed a storm had done in exactly a similar way a week before; but the north wind kept it at bay, and we luckily had not a snowstorm to face in addition to the other discomforts.

The night passed slowly enough; it was necessary to keep shuffling our feet and beating our arms together the whole night long without cessation, in order to prevent being frost-bitten, and it was even more difficult to keep awake. The hours, however, passed somehow, and at half-past four the first primrose streaks in the sky heralded the coming day.

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By five o'clock the welcome face of the sun peeped over the Trugberg, and we began to prepare for a start.

Our first thought was breakfast, but this solace was denied us; the wine and brandy had frozen during the night, and were solid lumps of ice; the bread required nothing less than an ice axe to cut it, and then probably would have flown into chips like a log of wood; the three remaining eggs we possessed had been converted during the night into icicles; there was nothing for it, therefore, but to start hungry and thirsty. Ambrose proposed that he and Zurbrücken should first cut the steps, and then come back for me, but after a very few minutes' exposure to the wind they were obliged to return and wait until the sun had warmed them a little; the biting cold of the night and exhaustion from want of sleep rendered it impossible to face the work of step-cutting in such a bitter wind. We resumed our seats, therefore, and waited another hour, and then commenced our descent to the bergschrund. We had to cut steps tne whole way down, and very glad I was we had not attempted it in the dark, as I think it would have been almost impossible to get over without an accident.

We pushed on steadily, but the night had taken all the spurt out of us, and our progress across the Jungfrau Firn was not very rapid. We hoped to find water under the Mönch Joch, where we had found a good supply a fortnight previously, but the wind had prevented the snow melting at the time we reached the spot, and there was nothing for it but to press on to Grindelwald, and it was not until we reached the end of the Viescher Glacier that we found any water to drink. At the Bäregg we got some ginger nuts to eat, and by three o'clock in the afternoon were being hospitably welcomed by the Bosses at the 'Bär,' whose welcome was never more appreciated. These estimable hosts soon had an excellent dinner ready, and by half-past four I was driving to Interlaken to rejoin the rest of my party.

This expedition was certainly made too late in the year, but I hope, as the climb is full of interest, that some member of the Club will repeat it, taking advantage of one of the long days in July or the beginning of August, in which case there should be no difficulty whatever in reaching the Bergli or Concordia hut, as a start could be made at three in the morning, and daylight can be relied on up to between eight and nine P.M.

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Note.

The unsuccessful attempt made by Mr. C. E. Mathews and Herr E. von Fellenberg to reach the Silberhorn by the west arête took place on June 29, 1863 (*Alpine Journal*, i. 134); Herr von Fellenberg (with Herr K. Baedeker) succeeding in making the first ascent of the peak on August 4, 1863, from the plateau between the peak and the Wengern Jungfrau (*Alpine Journal*, i. 197). In the first volume of the *Jahrbuch* of the Swiss Alpine Club (for 1864), Herr von Fellenberg has given a full account of both expeditions (attempt, 326–335; ascent, 335–358). On June 29, 1863, the party started at 2 A.M. from the Stufenstein Alp, and at 11.10 A.M. reached the foot of the overhanging rocks at the west end of the western arête. Melchior Anderegg was unable to overcome this obstacle, and Herr von Fellenberg declares emphatically that the north and south sides of the arête could not be traversed, saying of the former (that actually scaled by Mr. King's party) that a 'terribly steep snow slope descended towards the very crevassed glacier far below.' The party was, therefore, forced to return at 12.30, leaving a flag and a bottle with their names. When on the summit on August 4, 1863, Herr von Fellenberg saw clearly the flag he had left on June 29, and says that the ridge between is so steep and rugged, and the little glacier basin so crevassed, that even if they had been able to scale the overhanging rocks (or 'Flühlein') the party would certainly have failed to force their way up to the Silberhorn (p. 350). Mr. King's ascent by the western arête has thus solved an Alpine puzzle which was tried in vain twenty-four years before. It would seem that there is no previously recorded instance of a paper having been found after twenty-four years' interval, the longest cases yet mentioned in these pages being twenty-three years (*Alpine Journal*, xii. 467; xiii. 129).

Herr von Fellenberg gives two diagrams of the western arête of the Silberhorn (pp. 332 and 347), with all the various points of the route indicated. They serve to make quite clear the route tried in 1863 and achieved in 1887.

The Growth and Sculpture of the Alps.*

By Prof. T. G. BONNEY, D. Sec. R.S.

(The Tyndall Lectures for 1888, delivered at the Royal Institution, London.)

No. 1.

The geological history of the Alps, which is inseparable from the geological history of at least a large portion of Europe, is a far more complicated question than is generally imagined. Contrast a geological

* Some introductory paragraphs are omitted in which the author drew attention to the diversity of opinion which still prevails in regard to the geological history of the Alps, and the field which, notwithstanding the atten-

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map of this continent, blotched and spotted and streaked as it is with isolated groups of formations of all ages, from the very oldest to the most recent, with its mountain ranges past and present, its great, almost inland sea broken here and there by islands of no modern date, rising from comparatively deep water—contrast, I say, this diversity and seeming confusion with the attractive simplicity of the two Americas, which are only somewhat complicated in the neighbourhood of their Mediterranean—the Gulf of Mexico and the Caribbean Sea—and one begins to realise that the subject will not be easy.

In these lectures I must assume a slight knowledge of the leading facts and principles of geology, but shall avoid, as far as may be, technical details. The names and the order of succession of the strata are hung up to view to refresh the memory of those to whom these are not very familiar; and I must ask the more learned to forgive my avoidance of technical terms for the sake of those less fortunate than themselves.

About four years since I addressed a Friday evening audience in this room on 'The Building of the Alps.' What was then said bears upon the subject of these lectures, and more especially upon the present one. Hence, for the sake of completeness, I must venture occasionally to travel over old ground, though this, as far as may be, will be avoided, except where I wish to modify, or have need to amplify, my former statements. In regard to that lecture, I may say that, after four years of work in different regions, and two more visits to the Alps, planned expressly with a view of studying their geology, I have only some details to modify, while in regard to the leading principles, especially the more novel among them, I am prepared to speak more confidently and strongly than I could then venture to.

I purpose in these lectures to restrict myself to the geology of the Alps, but it is impossible to insulate them wholly from other mountain chains, or to separate it from the geology of at least a large part of Europe. To this, however, I shall only refer so far as may be absolutely necessary. But to dissociate the Alps from the Apennines and the Jura is impossible, from the Carpathians is not easy. They are closely connected with the ranges of the Dalmatian coast, with the basin of the Adriatic, and even with the great plain of the Po.

To say that a mountain chain is in intimate relation with a sea basin may seem at first sight a paradox, but it is none the less true. Perhaps it would be going too far to say 'without an ocean basin no mountain range,' but we may unhesitatingly assert that the one and

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tion bestowed upon them of late years, they still offer for research. He also said that, as this was the first of the courses of lectures instituted by the Royal Institution in honour of Professor Tyndall—a man so eminent, not only in science, but also as an explorer of the High Alps—the subject seemed especially appropriate. In conclusion, the author said, 'If in speaking I refer little to the work of others, this is not in order to pretend to originality in my own views. You are quite at liberty to suppose that everything in these lectures has been said by somebody, somewhere; only I shall state in them very little which I have not personally examined or independently investigated.' Here and there in the course of the lectures a few explanatory paragraphs are omitted.

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the other in numerous cases are most closely connected, and the development of mountain ranges is facilitated by the existence at no great distance of deep seas, so that, as Dana once observed, 'the greater ocean basins are commonly bordered by the greater mountain chains.'

Such a chain as the Alps may be described as composed of a series of rock masses, in part at least deposited in successive layers, and then bent into wave-like folds, as a number of heavy carpets, laid one on another, would be, if their opposite ends were brought nearer together. These folds are sometimes comparatively gentle, sometimes exceedingly sharp. Occasionally the thrust is so powerful that the folds are bent over in the opposite direction; sometimes the rock masses are even broken under the strain, and the upper part of the fold slides forward over the lower. While these disturbances were in process, heat and cold, rain and rivers, snow-slide and glacier, in some cases also the waves of the sea, were sculpturing and transporting, so that the mountain peaks are in many cases only remnants of masses far more gigantic; that vast rocky wall, which rises so grandly against the sky, is a mere ruin of the huge bulwark which once guarded the Italian lowland.

We learn from maps and sections of the Alps * that there existed first a mass of crystalline rocks—granite and other igneous rocks, gneiss and schists, the age of which we will presently discuss—which formed a kind of floor or foundation; that this, about the beginning of the Secondary period, began to sink beneath the waters, and continued so to do till toward the middle of the Tertiary; successive masses of rock —sand, mud, and limestone—being spread out over the sinking region, until at last the downward motion ceased; then the thickened earth-crust was upheaved and folded, perhaps at more than one epoch, and eventually some of the older and harder beds were in places actually bent back and partly thrust over the newer and softer rocks which form the outermost zone of the Alps.

What were the physical causes of this great down-bending of the seemingly solid crust of the earth, of these subsequent strange deformations, this extraordinary and repeated folding and thrusting, which has bent rock masses the thickness of which may be measured by hundreds, even by thousands of feet, almost as easily as if they had only been Turkey carpets?

This is a question which I must pass over briefly, as its complete discussion would occupy too much time and lead me away from the main subject. Two explanations have been proposed: each dependent on changes in the volume of the earth's crust resulting from changes in its temperature.

The one more generally favoured asserts that the globe as a whole has from the first been gradually cooling by radiation, that its outer crust first became solid, and that, when the still semiliquid zone below

* The lecture was illustrated by geological maps and by sections, taken more especially from Heim's *Mechanismus der Gebirgsbildung*, and the works of the Swiss Geological Survey. An admirable section (an extension of one by Heim) right across the Alps from near Zürich over the St. Gothard to near Como, will be found in Prestwich's *Geology*, vol. i. p. 334.

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in its turn cooled and began to harden, this, as it and the inner nucleus contracted, dragged with it the already stiffened crust, and compelled it to crumple here and there so as to adapt itself to the altered conditions. Thus the mountain chains are the wrinkles on the face of mother earth, and prove that her youth has long since passed away.

The result of this contraction would be to subject the earth's crust to lateral thrusts, which would produce a kind of puckering, relatively elevating one zone and depressing another. The one part would now undergo denudation, the other become an area of deposit. Rigid as the crust may seem to be, rigid as the necessities of physical considerations may require it to be when subjected to strains for limited periods of time, there is much reason to think that the solid possesses a certain plasticity which causes it to yield to forces acting continuously for long periods of time; so that the denudation of material from one area and its deposition on another causes the former to continue rising, and the latter to sink down yet further. But at last there is an end to these gradual movements, which affect broad zones of surface. The crust—for what cause or causes we need not now inquire—becomes weakened along certain lines or narrower tracts. Here, then, a sharp puckering occurs; the strata, new and old, are folded together; long lines of fracture occur, especially along the axes of these folds; sometimes the lower beds are bent back over the newer, and the former are even pushed completely over the latter. Wonderful instances of similar movements, producing the most marvellous complications and the most deceptive arrangements of strata, have been discovered, and quite recently described in the conscientiously elaborate survey of the North-West Highlands of Scotland, which is still in progress.

Obviously the result of these corrugations has been to diminish greatly the breadth of the zone which they have affected. It is believed that the folding of the Ardennes may have reduced the area occupied by the strata when they lay flat by one half—from 50 or 60 miles to 25 or 30. The Appalachians are estimated as having been compressed from 153 to 65 miles, and the Alps themselves from about 202 to 130 miles.

It has, however, been urged that the diminution of the earth's radius, which these and other like contractions would require, is more than we are justified in assuming; and other solutions of the difficulty have been propounded, notably one recently advocated by Mr. Mellard Reade, who refers the elevation of mountain chains to expansion and contraction of portions of the earth's crust, due to variations of temperature, dependent on diverse causes, and he has demonstrated experimentally that, if the edges of a plate of metal be fastened down, and the temperature of the inner part be raised, flexures somewhat similar to those in mountain chains will be produced.

The controversy is one into which time does not permit me to enter, so I content myself with saying that, notwithstanding the difficulties involved—and difficulties there certainly are—the explanation first mentioned, that is the elevation of mountain chains by lateral pressure due to contraction of the portion of the globe below the more

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solid crust, appears to me the more simple and more in accordance with the results of observation. The idea that lateral pressure rather than vertical expansion has been the cause has been strongly confirmed by the experiments of Mr. H. M. Cadell. These experiments, of which a brief account has appeared in 'Nature,' * appear to me of the highest value; for he has actually succeeded in imitating some of the more remarkable complications existing in the Alps and in the Highlands of Scotland.

It is now time that we glance at the materials of the Alps, at the building-stones of which these mighty mountain walls are composed. Assuming the general order of succession exhibited in the sections before you to be correct, I must attempt to indicate briefly what physical facts bearing on the growth and development of this mountain region we can learn from a study of the rock masses.

We have first to deal with the foundation stones, as we may call them, though in many cases they tower above the strata of later date, which for long before the birth-throes of the present Alps reposed peacefully upon them as a solid and, seemingly, sure basement. They are crystalline rocks, generally very hard, the origin of which is often a matter of considerable doubt. Once, as we have said, buried deep below masses of sediment, they are now upreared high above the sea. Of these the grandest peaks—the central *massif* of Dauphiné, the pyramid of Monte Viso, the summits of the Pennine chain, the peaks of the attendant Graians, the crags that crown the central range of the Tyrol—are all composed.

Into this great crystalline series rocks of very diverse characters and mineral composition enter. Their origin and history is still a matter of dispute. . . . At present it is enough to say that no doubt a not unimportant portion of these rocks have solidified from a state of fusion, were once granites, dolerites, and the like, which however, owing to subsequent mechanical disturbances, have assumed the structure which we name foliation. There is also no doubt that a considerable number are of sedimentary origin, and that these, under the influence of agents not precisely known, but probably heat, water and pressure, have lost their original structure, have entered into new mineral combinations, so that they are now crystalline schists. There is another group of more uncertain origin. It is possible that they may be either igneous rocks which have undergone exceptional modification, or sedimentary rocks of which the like must be said. This only can be positively stated, that the modifications in them were not due to the forces which have upheaved the present Alpine chain, but that at a very remote epoch in their geological history they, like the group just named, had become what they are now, perfectly normal gneisses and schists. How far we can approximate to that epoch we shall see in a moment.

I have spoken of modifications produced by the action of mechanical forces. It is only of late years that we have realised how important these are as agents of change, or metamorphism, as it is often called.

* Vol. xxxvii. p. 488.

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But its recognition, if I mistake not, has not been without drawbacks ; for geologists are very prone to fall in love with a new idea at first sight, and are so captivated with the charms of Miss Hypothesis as to be forgetful of her weaknesses, and anxious to turn her straight off into Mrs. Theory. Such, I foresee, will be the case in regard to the new agent of change to which the pedantic name of dynamo-metamorphism has been affixed.

In regard then to these foundation stones, we confidently say that they are very old, that they exactly resemble rocks which in some cases are certainly older than the Cambrian group, and in no case can be proved newer than it; that they seem to exhibit a certain order of succession, those members which appear to lie lowest presenting a remarkable resemblance to rocks in America, Scotland, and other countries, which can be proved to be of enormous antiquity; that over these comes a series of gneisses and schists, of uncertain origin indeed, but often with much to suggest that they are metamorphosed sediments, and lastly a less coarsely crystalline series, clearly the newest of the three, commonly separated from the others (which where fully developed seem to pass insensibly one into the other), and which are beyond doubt mostly of sedimentary origin.

Now, when we come to examine these crystalline rocks, we find they have undergone structural modifications of great importance, long after they had assumed a crystalline condition and had become, whatever their origin, perfectly normal gneisses and schists; we can further see that subsequent to the assumption of the last-named character they were invaded by great masses of granite and other igneous rocks, and that these also have undergone structural modifications. Moreover, when we observe that these later and superinduced structures are directly related to the main trends of the existing ranges and folds, we are disposed to refer them, at any rate in part, to the set of earth movements which produced the present Alpine chain.

These structures are of great importance, because the distinction of them from those which were pre-existent is absolutely necessary for a right understanding of the history of the rocks. Pressure, acting on ordinary sediment, produces a fissile structure, which is called cleavage, and is distinctive of slates. This structure may be coincident with the original stratification of the rocks, but more commonly it is inclined to it, at a considerable, often at a very high, angle. The effects produced depend on a variety of causes, among these being the constitution and chemical composition of the rocks, besides, of course, the intensity of the pressure. Sometimes the lines of original stratification are rendered more conspicuous, sometimes they are curiously folded or distorted, sometimes even obliterated. Occasionally there is not only a mechanical, but also a chemical, change in the constituents of the rocks thus affected; unstable minerals enter into new combinations, and a rock of igneous origin may in certain cases set up to some extent a banded structure. It is, however, uncertain at present how far this process can be carried—in regard to it hypothesis extends far beyond the domain of proof, and some geologists are disposed to give very free play to the scientific imagination. In the case of sedimentary rocks,

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such as an ordinary clay, minute filmy minerals, such as mica, chlorite, &c., are produced, so that the rocks present some resemblance to a crystalline schist. This, however, is only superficial; so that, so far as I know, a practised observer has little difficulty in distinguishing one of these micaceous slates from a mica-schist.

In like way the gneisses and crystalline schists undergo modifications similar to those of the stratified rocks; the original mineral bands of the foliated rocks are intensified, contorted, ruptured, sometimes almost obliterated, as in the case of the slates; and here the nature of the rock seems especially favourable to chemical change, as a result of pressure; for new minerals appear to be produced more readily and on a somewhat larger scale than in most sediments, so that the foliation which follows on mechanical alteration in a crystalline rock is more conspicuous than in the former case. Still, as a rule, we can identify it even here; and this, which I propose to call cleavage-foliation, is distinguishable from that earlier foliation which, as it at any rate simulates stratification, I have called stratification-foliation. By these names I shall hereafter designate them.

Now, in most parts of the Alps we cannot (as I have said) attempt to give a date to the fundamental gneisses and schists, further than to say that they must be very old, and analogy suggests that they are older than the Cambrian. In the Eastern Alps, however, we come nearest to assigning an inferior limit to their possible age. On the northern face of the central chain is a band of the oldest rock which we can identify in the Alps. Commencing in the less elevated region south of Vienna, where the Noric Alps are shelving down towards the great plain of the Danube, this band can be traced practically without interruption to the neighbourhood of Innsbrück. Fossils are not common, but enough have been found to show that in the main it belongs to the Silurian period. From beneath this rise members of the series of crystalline schists. Now, although commonly these belong to the uppermost group of schists, and though just here and there an accidental similarity in colour, and to some extent in chemical composition, in the two, together with the effects of extreme pressure, constructive in the one, destructive—from its completely pulverising the constituents—in the other, occasionally cause local difficulties in drawing a line between them, yet, as a rule, the two series are perfectly distinct—the one is a cleaved sedimentary rock, the other a true schist. Hence the uppermost schists of the northern side of the Tyrol must be very much older than the Silurian rocks. But these schists are also represented south of the central range, and can be traced without a break to the watershed between the Inn and the Rhine. With little interruption we can follow schists substantially identical, so far as my personal knowledge goes, from the Glockner to the Viso, but I might say along the whole chain of the Alps. Hence it seems clear that the newest of our foundation series is much older than the Silurian period.

Many pages are now missing from the Alpine record: the next great group of which we have any representatives in the higher regions is the Carboniferous. Rocks of this era occur in parts of the Eastern, rarely in the Central, and rather more largely in the Western Alps.

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The first I have barely seen, so I prefer to limit my remarks to the other two districts. The representatives of the Carboniferous era are commonly dark slaty rocks or quartzose grits; at the base occur not seldom coarse conglomerates or breccias; they sometimes contain fossils, usually plants. It is thus evident that these rocks in the main are of terrestrial or fresh-water origin. The coarser fragmental deposits suggest the action of streams flowing with considerable force, and thus the neighbourhood of an elevated land surface. The fragments themselves prove that, at any rate in Carboniferous ages, the crystalline rocks of the Alps were practically identical with those which rise up from beneath the later sedimentary deposits, and some of them indicate that even then a cleavage-foliation had been superimposed on a rock with a stratification-foliation.

Thus the Alps are not the modern upstarts which we sometimes consider them. They had ancestors at least respectable, though it must be admitted that the family went down in the world and for a long time was lost to sight.

The importance of these mountains of Carboniferous age will be brought into clearer relief as we continue the history of the region in the earlier stages of its submergence. There is, however, one point of interest to which I must draw attention, because it incidentally throws some light on the history of these ancient regions.

Near Le Freney in the valley of the Romanche troughs of Carboniferous rock are infolded in the old gneissic series. Now these troughs strike almost due N. and S., while the strike of the structures resulting from the Tertiary disturbances in this region is between N.N.E. and N.E., and the overlying Jurassic rocks are unconformable with them—indeed, may be said to pass sharply across their denuded edges—so that there must also have been important folding and denudation *after* the Carboniferous and *prior* to the Liassic age. Similar evidence is afforded by the sections about the valley of the Rhone between Martigny and St. Maurice, not to mention other districts.

We proceed now to the beginning of the great submergence, and here we must first examine the district of the Italian Tyrol. The cliffs which border the gorge of the Etsch or Adige between Klausen and Botzen, with their exquisite contrasts of red 'porphyry' and luxuriant vegetation, are becoming household words among travellers. The geology of this region has engaged for long the attention of German *savants*, among whom Baron Von Richthofen, so lately lost in the fulness of his powers, must never be forgotten. It has been explained to us in a lucid summary by our distinguished countryman, Professor Judd. These porphyries, and their associated but rather unfrequent tuffs, are the remnants of huge volcanos of (probably) Permian age. From them masses of lava, piled up in places to a thickness of 9,000 feet, but of comparatively moderate extent laterally, were ejected on either side of the present course of the Etsch, doubtless from more than one vent, and there is good reason to believe that other, though smaller, vents were opened at intervals westwards, at any rate to beyond the present Lake of Orta. We trace them eastwards to the neighbourhood

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of San Martino on the road to Primiero, where sedimentary rocks of Triassic age rest upon the crystalline schists.

Then began a long period of continuous and extensive subsidence. The craters of these volcanos were destroyed, their cones wasted. We find more or less completely overlying them a great series of beds, chiefly limestone or dolomite, which seem to have enveloped and entombed their lavas. They can be traced, as I will presently show, some distance to the west; they extend far away to the east. They continue practically undiminished in thickness until, north of the Pusterthal and the upper valley of the Drave, their foundation of schists and gneiss rises to form the central range of the Tyrol. Similar deposits of similar age compose the northern range from the neighbourhood of the Rhine about the Boden See far away to the east. Did this central range form an island in the Triassic sea, or were the sediments of that era once continuous across it? It is not easy to give a positive answer, but the comparative rarity of muddy deposits, and the almost complete absence of coarse sediment, make it probable that open water extended over the Eastern Alps, while the outliers which exist near the Brenner Pass suggest that the submergence was complete by the end of the Triassic period. But, inasmuch as the great Schlern dolomite, which belongs to the lower part of the Upper Trias (the Keuper of England), and beds equivalent to the Muschelkalk, and possibly to the Bunter, are often unrepresented in the central or northern range, it seems certain that the great highland district was at any rate not wholly submerged till late in the Trias, but that in the age of the Rhætic series, represented in England by rock only a few yards thick, but in the Eastern Alps by beds of limestone or dolomite, sometimes at least a couple of thousand feet thick, the older rocks had practically disappeared.

In the Central and Western Alps Triassic rocks are generally poorly developed and often entirely wanting, beds assigned to the Lias (as in Dauphiné) resting directly on the ancient crystalline rocks. Conglomerates or breccias sometimes occur at the base of them, but less extensively than we should have expected, so that the intermediate condition was probably a sea so studded with islands as to diminish the denuding force of the waves.

Now, inasmuch as the Trias and Rhætic are wholly wanting in parts of Central Switzerland and Dauphiné, and are represented by hardly less than 10,000 feet of rock in the Southern Tyrol, it is evident that either the level of the surface in the one region was some 10,000 feet higher than in the other at the beginning of the Trias, or else that if originally no great difference of level existed, the one region sank down far more rapidly than the other. The curious lenticular form of the Schlern dolomite, which is said to attain a maximum thickness of full 4,000 feet, and thins out in about twenty miles, seems to indicate the existence of a quiet land-locked basin in a region of slow submergence.

Some authors, indeed, have regarded the Schlern, the Langkofel, and other great peaks in this district as the remnants of *insular* coral reefs. This opinion, I think, is hardly tenable, but it is very possible

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that coral reefs and their detritus largely contributed to the formation of the above-named singular and now curiously picturesque masses of rock.

Thus were sealed up the volcanic vents of the preceding age, but not without a struggle. In more than one locality, submarine eruptions occurred, now represented by beds of volcanic ash, or by dykes and masses of basalt, dolerite, and even granite, which pierce into the cream-coloured dolomite. The chief centres of eruption were in the neighbourhood of Predazzo, where huge masses of igneous rock are found, showing that lavas of diverse mineral composition were successively discharged even at the same locality, and that very considerable volcanic cones must once have risen high above the coarsely crystalline rocks, which now form mountain masses about the glens of the Fassathal.

These eruptions, no doubt, occupied a long period of time, but they were certainly in full activity shortly before the close of the Trias, and do not, so far as I am aware, interrupt the continuity of the beds of the Rhætic series, while the Schlern dolomite is in many places pierced and rendered crystalline by their intrusion.

This, for a vast series of ages, so far as we can tell, was the last struggle. During the remainder of the Secondary period the earth's crust over the whole Alpine region appears to have been sinking slowly and generally uniformly downwards. Whether, on the site of some of the higher portions of the Alps, insular masses of craggy land still remained above water we have no means of knowing. But, on the whole, I am disposed to think that the submergence was complete and universal.

To this opinion I am inclined by the following considerations. Though there are now large tracts of crystalline rock without a trace of any Secondary deposits, which may well have formed islands, yet their relations with the latter rocks on their borders, and the fact that here and there they infold them as isolated masses, indicate that these beds formerly extended over a much wider area. We can, for instance, hardly doubt that the crystalline *massif* of Dauphiné, the peaks of which now rise full 13,000 feet above the sea, has been thrust completely through the dark slates, representative of the Lias. The latter are everywhere crumpled, contorted, bent back, around the edges of the protruded mass. Portions of them are uplifted high on its flanks—nay, one isolated patch still lingers 11,500 feet above the sea, to show the former wide extent of the newer rocks and the enormous flexures which they have undergone.

A glance also at the Western Alps, showing the Jurassic strata everywhere bordering the crystalline ridges, and occasionally infolded among them, as about Mont Blanc and in Dauphiné, not to mention other regions, suggests that they formerly extended unbroken across the existing ranges; nay, to the south-west of the Mont Blanc *massif*, the Secondary rocks are all but continuous from one side to the other, and the trough in the valley of Chamonix was doubtless once connected with the mass of secondary rock which forms the beautiful region south of the Lake of Geneva and sweeps across the Rhone to the

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Bernese Oberland. This is demonstrated by the occurrence of some beds of this era, full 11,000 feet above the sea, still capping one of the pinnacles of the Aiguilles Rouges.

Again, another reason leading me to the same conclusion is the character of the beds themselves. Had the islands been of any importance, we should have expected that coarse fragmental materials would have been common in these Secondary rocks, and that the beds themselves would have exhibited much local variation. Now, conglomerates and breccias are much rarer than I should have anticipated. The crystalline rock in Dauphiné is overlain in places by black slate, as though nature had taken a besom and swept the whole land surface clean before she began to use it for a foundation; and in these Secondary deposits even sandstones are not common, slates, once fine mud, or limestones, being usual, and these maintain their character with little change over large areas.

The sediment, therefore, of which the Secondary rocks of the Alps are composed appears to me to have a distant and general rather than a local and variable origin, and to form part of an extensive series of continuous deposits. Indeed it is not easy to suggest a source for it. If for a moment we endeavour to picture the map of Europe in early Secondary ages, we see an ocean interrupted by many considerable islands. These for the most part consist of crystalline rock—granite, gneiss, schists, and the like—primeval masses which have overshadowed the morasses and lowlands of the Carboniferous epoch, which have been again modified by the folding and thrusting which closed that long period of subsidence and deposition. By these last movements, districts, fully comparable in extent with those of the Alps and the Caucasus, were profoundly modified, and in many regions the lately deposited masses of sandstone and carbonaceous mud were exposed to denudation. It is not impossible that the dark clays which in Western Europe often characterise the Jurassic series may owe their colour, at any rate in part, to the carbonaceous rocks of the Coal-measure age. At the beginning of the Secondary era there was a huge continental mass of land in the North-west of Europe, of which Brittany, Cornwall, portions of Ireland and the Scotch Highlands, and the Scandinavian peninsula are the more important relics; a tract of which the non-marine members of the British and German Trias are at once the grave and the monument—a tract which may have extended as far south as the Vosges and Schwarzwald, and northwards over many a mile of the Atlantic. The great 'Wald'—the wild forest region—of Baden and Bavaria, of Saxony and Bohemia, must have formed a part. The highlands of Auvergne and the Cevennes cannot have been much separated. Then, as we have said, there was sea over the district of the Eastern Alps. Northwards, westwards, and eastwards, that sea extended, till the mountain summits of the continental region were often reduced to steep and rugged islands. As Sardinia, Corsica, and the Balearic Isles now rise steeply from the Mediterranean, so rose the Vosges, the Schwarzwald, the Auvergne mountains, and other tracts of primeval land from the ancient ocean.

This great downward bend of the earth's crust seems to have affected

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a very large part of the present continent of Europe. The old continental districts were reduced in area, or converted into chains of islands. The islands were one by one submerged. During the Cretaceous age more than one tract (for example, the Saxon Switzerland) which had remained above water all the Jurassic age was submerged, and the pure white chalk of England and Northern France indicates that the sea in this area received but little detritus. This and the alternation of shale and limestone, common for instance in the English Jurassic, may be well explained by the struggle between land and sea. Where the rivers could bear their burden to within the reach of the ocean currents, the sea water for a long distance was charged with sediment, and shale or clay was deposited. Where a more rapid subsidence had converted the river-valleys into fjords and had fringed the land-masses by a protective chain of islands, the sediment was deposited (as now in Norway) in the inland glens, and the sea itself was clean.

Whence then came the sediment which forms so considerable a part of the Secondary series of the Alps, for the limestones themselves are ofter far from pure? To that question I cannot give a satisfactory answer. As I have said, the nature of the deposits indicates that we must look away from the Alpine area, and as there is no reason to infer the existence of any important land area to the south, we must, I suppose, look to the great northern continent which I have already mentioned. Still, if this be so, the ocean currents must have been of exceptional strength, for the débris in the Jurassic period must have been transported to unusual distances. But on this point we have not yet sufficient detailed information to enable us to do more than speculate. Careful tables of thicknesses of the deposits all along the Alpine area, and a study of their materials, may some day give us the power to speak more confidently.

There appear to have been fluctuations and even local upheavals during the Secondary era; for instance, the Cretaceous rocks are sometimes missing in Southern Dauphiné, Eocene succeeding to Jurassic, and there is a marked break in the Saltzkammergut between the Neocomean and the Cretaceous series, but subsidence continued generally over a large part of the district till near the end of the Eocene; for on the Diablerets and neighbouring peaks we can recognise strata, now elevated from ten to eleven thousand feet above the sea, which nearly correspond in age with the clays and sands of Bracklesham and of the New Forest, and with the nummulitic limestone from which Egyptian slaves constructed the pyramids. These local interruptions are indicated by pebble beds—though rarely—by the unconformity at the base of the Gosau beds (high up in the Cretaceous group) and by the Eocene lignite beds of Häring in the Northern Tyrol. Still subsidence was the rule. The most perplexing phenomenon is the occurrence of great blocks of granite in the Flysch (Late Eocene), as in the Habkeren Thal, north of the Lake of Thun. The locality to which these must be referred is unknown; they do not correspond with any Alpine rock, but they are so large that we can only explain their transport by floating masses of ice, such for instance as still bear the rocks of Arctic lands to latitudes quite as far to the south in the Atlantic.

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By the end of the Eocene an era of change had commenced—change which has transformed the face of Europe—nay, of regions of far greater extent. Prior to this there were neither Alps, nor Pyrenees, nor Carpathians, neither Caucasus nor Himalaya—nay, I know not where to stop among the great mountain chains of Southern Asia. But restricting ourselves for the present to the Alps, we find the existing chain everywhere fringed with enormous masses of sandstone and puddingstone occasionally more than 7,000 feet thick, which to a very large extent were not deposited in the sea, but are the detritus and the spoil of mountain regions occupying in the main the position of the present Alps. The details of the Swiss Miocene, which are closely related to the physiography of the chain, must be reserved for the next lecture, so that I will now only say that all through the Miocene age the district between the Alps proper (the region of crystalline rocks, limestone, and slate) on the one side, and the Vosges and Schwarzwald on the other, was receiving detritus; the land sinking, especially parallel with the Alps, but the sea being on the whole driven back, until at last the newer material as well as the old began to be folded up, and the Miocene, like the Eocene, was closed by another period of mountain-making. The effects of this have been various. North of the Eastern Alps they have been comparatively slight, but they were considerable in the Western Alps, and at a maximum over the Swiss lowlands. There, as in the Rigi and the Speer, the deposits of the Miocene deltas have been uplifted some 6,000 feet above the sea, with which once they must have been nearly level, and for a very considerable distance the Eocene masses have been bent or thrust over their edges. The Alps, subject to minor modifications, were then left to the action of Nature's carving, to the heat and cold, rain and rivers, snowfall and glacier.

THE MUSTAGH PASS.

Its First Passage by a European Traveller.

The ordinary road from Cashmere to the Khanates of Central Asia, Kashgar and Yarkand, leads over the Karakoram Pass, 18,550 feet. It was this pass that was crossed by Sir Douglas Forsyth's mission, and on it Mr. Dalgleish was lately murdered. Some distance further W. in the same chain rises the great peak known as K 2, the second in height of mountains as yet measured, overlooking the ice-wilderness of the Baltoro Glacier, itself over thirty miles long,* and fed by numerous tributaries, each as large as the Mer de Glace. This greatest of glaciers in the temperate zone was visited and partially mapped many years ago by Colonel Godwin Austen, of the Indian Survey, who brought away many interesting sketches of its peaks, but failed to reach the passes

* The length of 61 miles, given in some geography books to the Central Asian glaciers, is got by unfair measurement and by disregarding watersheds, as if one measured the Aletsch Glacier from the Bell Alp to the lower end of the Grindelwald Glacier.

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that traverse it. These have of late years, owing to changes in the glaciers, fallen into disuse.

Last year Lieutenant Younghusband determined to crown a very adventurous journey from Pekin over the Gobi Desert to India by reopening the Mustagh Pass. The following account of his adventure is from the July number of the 'Proceedings of the Royal Geographical Society.' The two most remarkable points in it, perhaps, are the feats of the ponies, which, even more than in the Caucasus, seem to take naturally to ice, and the knowledge displayed by the traveller's native companions of the rudiments of mountaineering.

General Walker, late Surveyor-General of India, suggests that K 2 should be called Mount Godwin Austen. It is hardly yet conclusively proved that the peak has no native name, if not on the south, on the north side of the range, whence it seems to be conspicuous. Colonel Godwin Austen will, should his name be officially affixed to K 2, find himself in strange company. Two neighbouring peaks, of 25,660 and 26,470 feet respectively, are known as Masher-Brum and Gusher-Brum. The latter name, according to Colonel Godwin Austen, is equivalent to the Peak of Sunset. Mustagh, being translated, is Ice Mountain.

D. W. F.

We take up Lieutenant Younghusband's narrative at the point at which he approaches the Karakoram range.

'The Sarpo Laggo river flows down from the glaciers of the Mustagh Pass through a valley from a half to one mile in width. After ascending it for a few miles, we came in full view of the great peak, K 2, the second highest mountain in the world, 28,250 feet in height. We could see it through a break in the mountains rising up straight, bold, and solitary, covered from foot to summit with perpetual snow. The upper part, for perhaps 5,000 feet, was a perfect cone, and seems to be composed almost entirely of ice and snow, the accumulation of ages. The lower part was more precipitous, but not too steep to throw off the snow altogether, while at the base was a great glacier formed by the masses of snow which fell from its sides. It was a magnificent sight, and I could scarcely tear myself away from it. But we had some way still to go, as we had to push on beyond the Suget Jangal camping-ground for fear of meeting Kanjuti robbers, for the path from the Shimshal Pass, which leads to Kanjut, joins in there. Suget Jangal is the last spot where fuel can be got, so we collected a pony-load, and pressed on till we neared the foot of the great Mustagh Glacier, where we bivouacked for the night.

'Early next morning we started off to tackle the glacier, and here our real difficulties began, for after passing along for half a mile between the glacier and the mountain side, we found the way blocked by the ice, and we could neither get our ponies round the obstacle by climbing the mountain side nor by taking them on to the glacier. So they were sent back to the end of the glacier to wait till I had explored ahead with the guides. We plunged into the middle of the glacier, clambering about, often on all fours, amongst a jumbled mass of moraine and ice, passing cliffs of clear transparent ice and caverns composed entirely

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of ice, with icicles 20 and 30 feet long hanging from the roof. It was a most curious and beautiful sight. We ascended the glacier for a couple of miles, and then saw it stretching ahead for many miles more. The guides thought it would be impossible to drag a caravan of ponies up it, and I decided on sending them back by the Karakoram Pass to Leh and going on over the Mustagh Pass with three men, as I had also to take into consideration that our supplies would be running short. But on returning to the caravan I found that one of the men, who had been exploring the opposite side of the glacier, had found a way, and was gallantly leading the ponies over it, though they were knocking and tumbling about in a fearful way. Their legs were getting cut to pieces, and the loads were falling off every five minutes. It was cruel work for them, for they had no chance of keeping their footing on the slippery ice, which was usually only covered over with a thin coating of gravel. However, as a start had been made, I determined on making a renewed effort to bring them up the glacier. But they very soon got exhausted, so we halted for the day, and I then went off again with the guides to explore a route for the next day. We kept on up the east edge of the glacier, marking with small cairns the route which was best for the ponies to follow, and returned to our bivouack after dark, thoroughly exhausted, for it is terribly hard work walking over those glaciers, and the rarity of the atmosphere at these great elevations adds to one's distress.

'At daybreak the following morning we started again, leading the ponies up the route we had marked out; but a mile from the point where our previous exploration had ended, we were confronted by another great glacier rolling down from the left. The guides set off to explore it while I remained with the ponies, as my boots were worn out, and my feet so bruised I could scarcely bear to put them to the ground. The men returned after a time with a look of despair and said they could find no possible way for the ponies to get over the glacier, but they said: "You have a try, Sahib; perhaps by your *ikbal* (good fortune) we may find a way." "All right," I said, and we started off back again for some distance, and then struck off right into the centre of the glacier, and ascended a prominent spot on it, from which we could get a good view all round. We were in the middle of a great sea of ice, for the glacier was four or five miles broad, and composed of pure white ice broken up into a mass of needle points, and great glaciers came rolling down the mountain sides like clotted cream pouring out of a cream-jug. From the point on which we were standing I could see a thin line of moraine extending right up the main glacier. We got on to this and followed it up for a long way, and, to our great relief, found it would be quite possible to bring the ponies up it and get them on to the smooth snow in which the head of the glacier is buried. On our return journey we nearly lost our way, and were wandering for some time in the dark before we managed to find it. We held a consultation of war that night as to which pass we should attack, for there are two leading out of the valley we were ascending. The old Mustagh Pass to the west had been out of use for thirty or forty years, on account of the accumulation of ice upon it, in consequence of which

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a new pass had been sought for, and another more to the east had been found. This latter pass had been in partial use up to ten years ago. No European had, however, crossed either of them, but Colonel Godwin Austen in 1862 came very near the summit of the new pass from the southern side, when he was obliged to turn back on account of bad weather. One of my guides had at one time taken ponies across it. I decided, therefore, to send on a couple of men to reconnoitre the new pass the next day, while the remainder of us brought on the ponies up the glacier.

'Early in the morning the reconnoitrers set out, while we followed as soon as we had loaded the ponies. Our difficulties were not so great this day, and in the evening we halted on the glacier. Towards dusk the two men returned from the new pass and said it would be quite impossible to get ponies down it, and that it would even be difficult for men, as masses of ice had formed. They said the best thing to be done now was to leave the ponies where they were, under the charge of three men, and set off with the rest over the old Mustagh Pass to Askoli, the first village on the other side, send back supplies from there for the ponies and men left behind, and collect a number of coolies to try and make a passage for the ponies over the new pass. Things were getting critical now, for supplies were running short, and where we then were no fuel could be obtained, and the ponies could only feed on some few scraggy weeds which we could see across the glacier on the mountain side. So, if on the morrow the pass should prove impassable, our fate would probably be a hard one, as provisions would scarcely last out till we could get back to an inhabited spot again.

'It was an anxious night that, and it was also a very cold one, for we were sleeping out in the middle of the glacier with a horribly cold wind blowing down it, and we only had just sufficient fuel for cooking purposes, and could not afford to keep a fire going for a moment after our evening meal was cooked.

'Next morning, while it was yet dark, we started for the pass, leaving everything behind, except a roll of bedding for myself, a sheepskin coat for each man, a few dry provisions, and a large tea-kettle. The ascent to the pass was quite gentle, but led over deep snow in which we sank knee-deep at every step. We were now about 19,000 feet above the sea-level, and quickly became exhausted. In fact, as we had got near the summit, we could only advance a dozen or twenty steps at a time, and we would then lean over on our alpenstocks, and gasp and pant away as if we had been running up a steep hill at a great pace. It was most tantalising, for the top looked so near, and the slope was so easy, that it seemed as if we could run up in no time. But it was not till midday that we reached the summit, and then on looking about for a way down we could see none. Huge blocks of ice had fallen from the mountains which overhang the pass, and had blocked up the path by which travellers used formerly to descend from it, and the only possible way now of getting to the bottom was by crossing an icy slope to a cliff, which was too steep for a particle of snow to lodge on it, even in that region of ice and snow. From this we should have to descend on to some more icy slopes which could be seen below.

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'Nobody spoke as we looked down that pass, and I waited anxiously for the next move. I could not give an order to go ahead, for I felt incapable of going first myself. I heard them asking each other who should go first, and at last Wali—the finest fellow that ever stepped—quietly took an axe, tied a rope round his waist, and, giving the end of it to us, told us to follow him.

'We had first to cross the icy slope: it was of smooth ice and very steep, and about thirty yards below us it ended abruptly, and we could see nothing over the edge for many hundreds of feet. As Wali hewed the steps we advanced step by step after him, leaning back against the slope, all the time facing the precipice and knowing that if we slipped (and the ice was very slippery, for the sun was just powerful enough to melt the surface of it) we should roll down the icy slope and over the precipice into eternity. Half-way across, my Tartar servant Drogpa, who had been born and bred in the heart of the Himalayas, gave up, saying he was trembling all over and could not face the precipice, so I sent him back to the ponies, which he afterwards brought round by the Karakoram Pass.

'After a time we reached *terra firma* in the shape of a projecting piece of rock, and from here began the descent of the cliff. We had to let ourselves down from any little ledge, taking every step with the greatest possible care, as the rock was not always sound; and once a shout came from above, and a huge rock, which had been dislodged, came crashing past me and as nearly as possible hit two of the men who had already got some way down.

'At the bottom of the cliff we came to another steep ice-slope. We tied together every scrap of rope we had, and every turban and waist-band, and then let Wali down by this on to a small piece of bare rock which showed through the ice. As he went down he cut steps in the ice. He then seated himself firmly on the rock while we tied the other end of the rope on to a rock above.

'Then each man let himself down hanging on to the rope. One man in doing so slipped, fell over on his back and slid down at a frightful pace, still, however, clinging to the rope with one hand, which was fearfully cut by the friction.

'Then came the last man: he was the slave I had released at Yarkand; and how he got down has been a puzzle to me then and ever since. He tied the end of the rope round his waist, and then with the aid of an alpenstock which he used in a most dexterous way, and the steps which had been hewn for him, he came gradually down; and as he advanced we pulled in the slack of the rope at the bottom end, so that if he fell we could pull him up sharp. In this way we got down two more stages of the ice slope. Then came a piece where there was no suitable halting-place within the length of the rope. Luckily, however, it was less steep, and we were able to get down it by hewing steps. And at last, just as the sun set, we reached the bottom. As I looked back at the pass it seemed utterly impossible that any man could have got down such a place.

'Our troubles were not yet over though, for we were now on a snow-field at the head of a glacier, and all round us were great mountains

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covered with snow and ice, so we had to trudge on over the snow and glacier till after eleven at night. We frequently met with crevasses, down which one of the men fell, and as he was the last was not missed for some little time. Ordinarily we should have thought twice before going so recklessly over this glacier, but we were now so utterly tired, and so overjoyed, too, at having got over the difficulties of the pass, that we pushed along in a sleepy, careless way, perfectly unmindful of the dangers of the road, till at last we came upon a dry spot where there were a few weeds. We collected these, lit a fire with the aid of them and a couple of alpenstocks, cooked some tea, and then rolled ourselves up in our wraps behind a rock and slept as only those can sleep who have done eighteen hours' continuous work of such a description as we had had to do that day. At daybreak next morning we were on our legs again, and after a few hours' travelling emerged on to the great Baltoro Glacier, which was explored by Colonel Godwin Austen in 1862 when making the Kashmir Survey and described by him in a paper read before the Geographical Society. We travelled all that day, and for two days more till we reached Askoli, a little village situated on the Braldo river, where it was most refreshing to see the trees and cultivated lands which surround it. I immediately set to work to collect supplies and coolies, and when this was done sent off one party with supplies for the men and ponies I had left behind on the other side of the pass, and then started myself with another party of coolies to try and force my way back by the new Mustagh Pass.

'I ascended the Punmah Glacier, but was brought to a standstill opposite the camping-ground of Skinmang, three days' march from Askoli, by a glacier which had rolled down from the pass. We had managed in some fashion or other to get over a good many glaciers in the passage of these mountains, but this one was the most unnegotiable of them all, for in the last four or five years the mass of ice had greatly accumulated. There were great blocks of ice as big as houses tumbled about, one on the top of the other, in such utter confusion that we could not get a footing on it at all.* We were obliged therefore to turn back to Askoli. I had given orders for the party with the ponies that if I did not reach them by a certain date after they had received the supplies they should make their way to Leh by the Karakoram, under the charge of the Ladakhi servant Drogpa, who had gone back to camp from the old Mustagh Pass. So when the coolies who had taken the supplies returned to Askoli, and brought me news of the safety of the party with the ponies, I started off for Skardo and then through Kashmir to Rawalpindi, which I reached on November 4, just seven months after leaving Pekin.

'Drogpa with the ponies arrived seven weeks later, having come round by the Karakoram Pass route, where they had been attacked by robbers, and where also three ponies died from fatigue and exposure. Poor Liu-san, the Chinaman, too, arrived completely knocked up by the hardships he had had to go through.'

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* I understand from the author that these obstructions were the result of ice-avalanches which had fallen from overhanging glaciers.—D. W. F.

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ALPINE NOTES.

ASCENT OF CHAMPAGNE CASTLE, IN NATAL.—We are indebted to Mr. T. W. Wall for the following very interesting extracts from a letter written by the Rev. A. H. Stocker, describing a successful ascent of the reputed highest point of the Drakensberg range, in Natal: 'The range of the Drakensberg (also called the Kathlamba Mountains —the name is generally spelt without the "t," but pronounced as I have written it) is the western boundary of Natal. The high part of the range on the Natal border is from 50 to 60 miles long and about 10,000 feet high. The supposed highest point is Champagne Castle, which by aneroid I made 11,355 feet high. My young brother and I camped out in a small tent on the upper shingle of a mountain stream (c. 5,625 feet) in a lovely gorge some three or four miles from the hill. On Thursday, April 26, 1888, we started at 6.30 A.M. up the gorge for about half a mile, and then struck up the eastern spur of the mountain. Steep grass slopes led up to a rather interesting but broad arête, which abutted against the eastern precipice, leaving a sheer wall of 500 feet of rock quite unassailable. When at a height of 8,545 feet we left the arête by very steep grass slopes, and worked to the left (i.e. south) along a grass ledge, round the S.E. angle of the mountain. The only difficulties lay between the S.E. arête and that one of the southern arêtes which tapped the southern precipice. The first gully was easy to cross, keeping about level. We had to descend a little in the second gully to turn the foot of a *Krantz* (i.e. a precipice) by very steep grass. In the third gully we had to cross a nasty sloping rock with a drop of a hundred feet at the outer end, and one of 40 feet at the gully end. In the fourth gully we met with ice-glazed rocks, rather nasty, and the gully itself was unpleasantly slithery. The next shoulder was the one we were aiming for. It was very easy, and led to an easy slope up to the top of the *Krantzes* (10,635 feet). The summit is double, the eastern point being the lower but the finer, and ending in grand *Krantzes*. The western point is a flattened dome, extremely dull and uninteresting. There are *Krantzes*, gullies, and arêtes on the southern face, but we had not time to examine them. We got to the top at 2.30 P.M., and only stayed ten minutes. There was a fairly keen wind, but the thermometer was only 46° in the shade. The view was fairly good, but spoilt by clouds. We set fire to the grass on the top to let people below know that we had got up, but no one saw it—too much cloud, I am afraid. We descended by the Champagne Castle Pass (11,135 feet) to the south, the stoniest and most abominable gully I ever was in. It was full of glacier débris and ploughed up by the stream. The going was terrible, and the result was that we did not get back to the tent till 10.20 P.M. Luckily there was a moon. The map distance (but I believe the map to be hopelessly wrong in many other points, so probably wrong in this too) was eight miles altogether, and it took 15h. 50m. Not particularly fast time! It was a most interesting excursion, and the scenery was simply magnificent. The view from an old terminal moraine,

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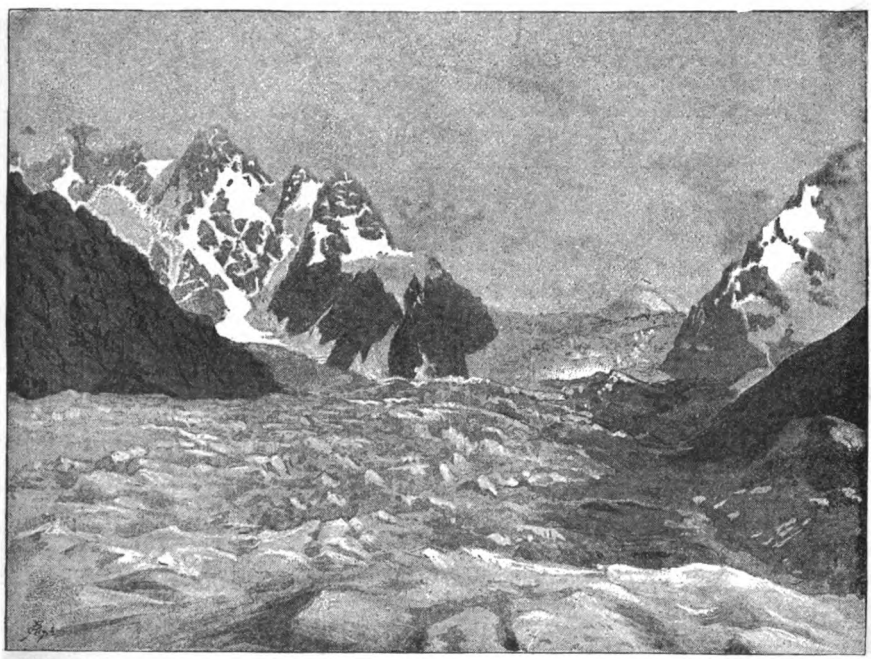
Déchy phot.

ELBRUZ FROM TERSKOL



Déchy phot.

THE ICEFALL OF THE KARAGAM GLACIER

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about four miles above our upper tent, is the grandest I know anywhere—a lovely valley with four magnificent peaks at the upper end, two square blocks, and two aiguilles, lying to the north of Champagne Castle. From the summit of our peak we saw one peak in the range which looked as high as ours, and one in Basutoland (further west) decidedly higher. There was also a distant range which looked higher. There seem to be two kinds of rocks in particular—a red rock, which forms sheer precipices, and a greyish blue rock, which weathers black, and which, I think, is climbable. These may be syenite and protogine gneiss.'

NEW MAPS OF THE CAUCASUS.—In General Chodzko, the officer under whose charge the Five-verst Map was made, the Caucasus has had its Dufour. A surveyor who, thirty-eight years ago, forced his Cossacks to camp for five nights on the top of Ararat, 'in a large and deep cavity cut in the snow,' at an elevation of nearly 17,000 feet, deserves the respect of all mountaineers.* But no first survey—much less a survey executed under the extraordinary difficulties from hostile tribes as well as from impenetrable mountain fastnesses which attended the original Caucasian Survey—can hope to approach perfection.

General Shdanov, the present head of the staff at Tiflis, is actively employed in carrying on the work of his predecessor. From the Dariel Pass westwards new sheets are being published on the scale of the original drawings of the Five-verst Map—that is, on the scale of one verst to the inch. In these the glaciers are indicated with much greater precision than on former maps. These sheets now extend as far as the Mamisson Pass. It will be interesting to see how the surveyors succeed in grappling with the intricate problem presented by the great névés of the Adai Choch group. To do this thoroughly they will have to climb Bordjula or to penetrate to some point overlooking the snowfields which feed the icefall—one of the finest in the Caucasus, 4,000 feet in height, of which a plate from one of M. de Déchy's photographs is given opposite. It has only once been traversed—by Messrs. A. W. Moore, D. W. Freshfield, and C. C. Tucker in 1868, when (as is told in 'The Central Caucasus') six hours were spent in forcing the passage.

One important point to be decided in the new survey will be whether the peak ascended by M. de Déchy in 1884 is that marked 15,241 feet in the Five-verst Map, and also what is the name it is best entitled to. It is undoubtedly the Adai Choch of Mr. Freshfield's 'Central Caucasus;' but it is far from certain that this peak is the one measured. It is certainly not in the position assigned to the measured peak on the map, and last year Mr. Freshfield saw one or more lofty peaks behind that ascended by M. de Déchy, and apparently of at least equal height. It may be that one of these peaks, which lie on northern spurs, and not on the watershed, will claim the ascertained height and the Ossete title of Adai Choch, and that the peak over the Rion sources will have to be content with the designation Tuilsas Mta, assigned to it by Dr. Radde. It will be unfortunate should such a

* *Alpine Journal*, vol. viii. p. 215.

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change become necessary; and the summit ascended by M. de Déchy will always, like the Wetterhorn, remain pre-eminent in the eyes of travellers, even should it have to yield by a few feet to a rival.

The Caucasian staff are also engaged on a physical map of the glaciers of Elbruz—a work of the highest interest. An advance copy of the first sheet is before us. It shows the sources of the Baksan and their glaciers from the two peaks of Elbruz to Dongusorun. The glaciers are laid down with a precision rivalling that of the best European surveys; many heights are given in Russian 'sashines,' seven of which go to the foot, and the map is coloured so as to show the nature of the ground, icefalls, &c. It is at once obvious that the former survey completely misrepresented not only the details but the leading features of the mountain structure. It may be enough here to point out that the bearing of the N.W. peak of Elbruz from the S.E. is shifted from N. 41° W. to N. 76° W., that the heights given are equivalent to 18,470 feet and 18,347 feet for the two peaks, and that the distance between the S.E. peak and the watershed is reduced from 11¼ to 7 miles. Bashi is the equivalent for peak in this district—thus, Dongus-orun-bashi = The peak of the place of pigs. The name is applied to several summits on the right of the Baksan sources. It may be found ultimately convenient to give the highest point—it lies just S. of the watershed—of the broad peak seen from Urusbieh the name of Josinghi Tau, from one of its glaciers. The view given of Elbruz on this side is from a photograph taken by M. de Déchy in 1884. The reproductions of both photographs have been made and lent by the proprietors of the 'Graphic,' who are about to issue a series of Caucasian views in the form of a supplement.

The Selkirk Range.—The Canadian Pacific Railway has run a high-road of commerce through the wilderness. On no section of its long course is the scenery so interesting as where it traverses the portion of the Rocky Mountains known as the Selkirk Range. From the summit of the Kicking Horse Pass a considerable glacier is seen pouring, like the Glacier du Tour, in a broad icefall from the side of a bold rock-peak known as Mount Sir Donald. Here a first-class carriage was deposited shortly after the opening of the line and named 'The Glacier Hotel'! This temporary device has already been superseded by a substantial building. The country, however, beyond the view of the line is still practically unknown, and the statements occasionally made as to the heights of the peaks and the extent of the glaciers are mostly premature. Some more trustworthy information should shortly be attainable, as the Rev. W. S. Green, of this Club, has been commissioned by the Royal Geographical Society to make such a preliminary exploration as may be practicable in one season, and has lately left England for that purpose. His journey will, we hope, lead to the opening out of a field for mountaineering which may in the future contend with the Caucasus for the favour of our members. Meantime the following note may be read with interest:—

'The "Big Glacier" is situated at a distance of about three miles from the Canadian Pacific Railway, and is visible from the highest point over the Selkirk range reached by that line. There are many other

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glaciers in the neighbourhood, but they are of much smaller dimensions. The "Big Glacier" itself, however, must be classed, in point of size, with the third-rate glaciers of Switzerland; but it possesses one thing in common with the larger Swiss glaciers—a first-class hotel on the line of railway. This hotel was built several years ago for the accommodation of visitors to the glacier; but, although the glacier is so near, no one had the energy to go far up it, the visitors contenting themselves with walking to its foot and perhaps wandering half an hour up it, but no more. The country around is practically unknown, and information from the best authorities in the Dominion is quite untrustworthy.

'In March last my brother and I found everything covered with snow 8 to 10 feet deep round the hotel, and anywhere up to 60 feet through the trees. We came provided with snow-shoes; without we could have gone nowhere. But they are not unmixed pleasures; for we soon found that snow-shoeing uphill was very different from snow-shoeing on the flat. Having reached the foot of the glacier, we ascended its left bank by the moraine, which must be 50 feet high in summer, but was now, owing to the snow, nearly level with the surface of the glacier. We each wore two pairs of socks, one pair of stockings, besides moccasins, the thongs of which, however, considerably blistered our feet, and could not be loosened, as they were frozen hard to the shoes, as were the stockings to the moccasins. The snow-shoes were of the usual Canadian pattern, long, not round as they should be for mountain use. When ascending a slope one must tread with one foot nearly at right angles to the snow-shoe and not pay any attention to the pain of so doing. When coming downhill the toe of the shoe will bury itself in the snow, and one is brought quietly down on one's nose. Still it is wonderful how steep a slope can be ascended by means of these snow-shoes, though it is tiring work, and they are nearly useless for descending. A ball of snow continually forms between the foot and the shoe. This must be removed, which we did with our ice-axes, this being the chief service they rendered us on our excursion, as we encountered no difficulties. We turned the ice-falls with ease, the crevasses being mostly choked with snow. The snow-fields which feed the glacier are not large, lying in a sort of cup surrounded by rocky peaks, and descending into the valleys below at several points. The views we gained from several high points on the glacier were very fine, the expanse of country seen being really wonderful—nothing, too, but snow-covered mountains. The finest thing of all was Syndicate Peak, otherwise known as Mount Sir Donald. It stands up alone with its three steep rocky sides. No one has yet attempted to ascend it, and it was for the purpose of examining it that we made these excursions on the "Big Glacier." Like many other peaks in the Selkirk range, it is well worthy of notice from a climber's point of view. The Selkirks are unlike the Rockies, for, while in the latter every peak, however precipitous on other sides, has always one side by which the summit is very easily gained, in the former Mount Sir Donald seems to have no easy side at all. Of course, later in the year, when there is less snow, one could judge better; but in March we could find no

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route up it which was likely to be good. The height of Mount Sir Donald is probably underestimated. Our highest point was 9,000 feet above the sea level (4,800 feet above the hotel), and Mount Sir Donald appeared to be at least 3,000 feet higher than our highest point.

At this height of 9,000 feet we sat smoking for three-quarters of an hour, the sun being very warm, though a thermometer placed in the shade cast by our bodies on the snow registered four degrees below zero! We found it hard to chew the provisions we had brought with us. The spirits-and-water, too, which I had brought in a flask, placed in my inside breast-pocket, resembled a water-ice in consistency. We made three excursions in all over the 'Big Glacier,' and 'located' the various peaks around, hoping to return in the autumn. The snow in the Selkirks melts very late in the year, and hence July, August, September, and October are the best months to visit them. Game, too, is plentiful in the autumn. The country around is unknown, so much so indeed that probably we were the first human beings who had ever looked upon many of the valleys which we saw from above. Anyone who comes here must be prepared to be taken for a railway employé, a mining prospector, or an engineer. We ourselves were supposed to be taking measurements for the purpose of running a road from the hotel up to the snow-fields at the head of the glacier, where we were to make a trotting-course, bridging over and otherwise eliminating crevasses, and all this for the purpose of enabling tourists to don their furs in summer and to enjoy a sleigh-drive in the park above.

HAROLD W. TOPHAM.

THE ZWÖLFERKOFEL FROM THE GIRALBATHAL.—We learn that this route (tried previously many times in vain) up one of the highest (3,085 mètres = 10,122 feet) and boldest pinnacles of the Sexten Dolomites, was successfully accomplished on August 29, 1887, by Herren G. Winkler and R. Schmitt without guides. Starting at 4.30 A.M. from a hut at the end of the Giralba valley (¾ hr. from the Giralbajoch) they took to a couloir about two hundred steps above the Schwarz See, and climbed up it to where it divides into two branches. Keeping them to the left (6.45) over easy rocks they gained a broad shelf of *débris*, turned a great tower surmounted by a smaller one, and then followed the shelf from N.E. to S.W. A chimney led up to a secondary summit, whence a difficult descent to a gap (at the head of the well-known ice gully) and another ascent led to the highest point at 4 P.M. The party were benighted on the way down. This new route has the advantage over the old one (*viâ* the ice gully) of being free from all danger of falling stones, and had been several times previously attempted, but in vain. The well-known guide Michel Innerkofler has found another way up the rocks on the south side to the left of the ice gully.

HYPSOMETRY OF THE DOLOMITES.—The following note has been received:—

'It may, perhaps, be of some interest to the members of the Alpine Club to know the results of the new Austrian survey with regard to the heights of the Primiero group, which, although not yet published, have been communicated to me by the kindness of the

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direction of the Austrian "Militär-Geographische Institut." The results of these new measurements are the most important contribution to our knowledge of the hypsometry of the Primiero Dolomites, and our previous opinions on this subject have been essentially altered by them.

'The following table contains a list of the heights fixed by the new survey:—

	New Survey	Old Survey	Previous Authorities
	m.	m.	m.
Cimon della Pala . .	3,186	3,220	3,343 (Kataster measurement)
Cima di Vezzana . .	3,191	3,061	3,317 (Kataster measurement)
Pala di San Martino .	2,997	3,054	3,244 (Trinker)
Fradusta . . .	2,930·7	2,927	
Rosetta . . .	2,740	2,738	2,810 (Frischauf)
Cima di Ball . .	2,693	none	2,833 (Euringer)
Passo di Ball . .	2,450	„	
Cima Cimedo . .	2,499	2,537	
Sass Maor . . .	2,816	2,813	
Passo della Val di Roda	2,568	2,754	
Figlio di Rosetta .	2,469	none	
Passo Venezia . .	2,298	„	

'The Kataster measurements, which have been thought up to now to be the exact ones, have been proved far too high by the new survey. The culminating point of the group is now considered the Vezzana, instead of the Cimon della Pala. The latter, long considered the second in height among the Dolomite peaks, must leave this honour to the *Antelao*, 3,320m., according to the new Italian survey. Amongst other Dolomite peaks the *Marmolada* has been found considerably lower by the new survey, i.e. 3,359m., instead of 3,494m.

'I shall be glad if these few notes are of some use to the readers of the *Alpine Journal*.

'Dr. Carl Diener,

'President of the Oesterreichischer Alpen-Club.'

English readers will have been to some extent prepared for the reversal of the old measurements of the Pala and Vezzana by the opinions expressed both by Mr. D. Freshfield and Mr. Tucker on the occasion of their first ascent of the latter peak.* It will be seen that their assertion that the Pala overtopped them, if at all, 'by the height of its stonemen,' erred only on the side of modesty. The right eyes in the right place have in this instance proved more trustworthy than a Government survey imperfectly conducted.

Alpine Games.—Alpine games naturally suggest some variety of athletic sports, and carry our thoughts back to the diversions of wrestling, racing, and stone-hurling, with which Berlepsch ('Die Alpen in Natur- und Lebensbildern') has familiarised us. In this note, however, the

* *Alpine Journal*, vol. vii. p. 63.

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term is used in a far more humble sense to denote certain parlour amusements relating to Alpine subjects, which have doubtless contributed to create the belief (so commonly held by outsiders) that climbing is a succession of hairbreadth escapes. Two specimens of these have lately come into my possession, and may be briefly described as curious illustrations of an aspect of Alpine history hitherto unnoticed in these pages. One of them is 'The New Game of the Ascent of Mont Blanc,' published at the Egyptian Hall, Piccadilly, *sine dato*, but in connection with Albert Smith's panorama of Mont Blanc, and therefore probably some time early in the fifties (lecture first given there March 15, 1852, ascent having been made August 13, 1851). It consists of a sheet of coloured sketches, numbered 1 to 50, representing different stages on the way from the Egyptian Hall to the summit of Mont Blanc, Chamonix not being reached till No. 30. Six players, each provided with an ivory marker and three dozen counters, take part in the game, which is played with a hexagonal teetotum. If the unlucky player obtains No. 3 or 6 by his spin of the teetotum, he cannot move; in other cases he moves his marker according to the number obtained. On reaching each diagram the player pays or receives so many counters, according to a very elaborate system set forth in the rules; *e.g.* pay 6 at the St. Bernard Hospice, receive two from each player when the glacier—at No. 38—is first reached. Some of these penalties are amusing; 3 must be paid to keep the Grands Mulets hut in good condition for other travellers, 3 for the benefit of the families of the guides who perished on the Grand Plateau, 2 received from each player when the Mur de la Côte is surmounted, and 6 paid on slipping at No 49. The player whose marker first reaches the summit of Mont Blanc receives all the counters in the pool. The sketches (some of them reproduced in Albert Smith's book on Mont Blanc) are in many cases delightfully old-fashioned. The game shows what a great impression Albert Smith's lecture made on all classes in England, for it must be reckoned as one of the most powerful influences which popularised mountain-climbing among Englishmen. His ascent of Mont Blanc in 1851 was the main cause of the increase in the number of ascents which begins to show itself from 1854 onward. The sheet of sketches, book of rules, coloured markers, and teetotum are enclosed in a box. The item was marked 'very rare' in the bookseller's catalogue, from which I purchased this curious Alpine antiquity for the sum of 16*s.* 6*d.*

The other game is concerned with the Matterhorn and will be remembered by frequenters of the old Riffelhaus, in the *salon* of which there existed, as lately as 1886, an imperfect copy of this game. The following description is taken from a new specimen which I purchased for seven or eight francs at Bern in September, 1886. It is enclosed in a large box with a trilingual inscription, the English version being, 'Up to the Matterhorn.' It consists of a large double diagram (made to stand up) of the Matterhorn, representing the Zermatt and Breil sides respectively. A number of slits (31 in each case) show the route on either side. The game is played with twelve tin figures, half being guides and half travellers, which are divided into two parties, each being provided

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with a flag. Each party has a die, and each pair (tourist and guide, who must never separate) throws in turn. One step is gained if 1, 2, 3, or 4 is thrown; if 2, 3, 4 comes up, and the traveller is in one of the three *mauvais pas*, he falls down on each side as many steps towards the glacier, and can only remount one step at a time, because 'being pulled out again is a slower proceeding than falling in,' his terrified companions being delayed until their unlucky comrade is hauled up to them again. If 5 or 6 is thrown, the pair must in any case remain where they are, and their friends too, 'some difficulty in the ascent, or the necessity of taking refreshment, delaying their progress.' That party wins, the last member of which reaches the summit before the last member of the rival caravan. It is expressly provided that the guides must precede the travellers during the whole game. The winning party plants its flag on top, and takes all the contents in the pool, two counters (a small bag of which is in the box) being paid for each pair at starting, every one that falls into a crevasse paying the number of his cast. I regret to say that each traveller is armed with an alpenstock, ice-axes being reserved for the guides. The directions for playing this most exciting game are headed by a quotation from Dickens, 'It's very nice if you make believe very much,' and open thus:—'This game enables any child to ascend thisworld-renowned summit, if it will only identify itself with one of the tourists mentioned below. Accidents may certainly occur, if one does not mind one's P's and Q's, but help is always near, and the most beautiful view will reward the brave mountaineer at the top.'

Both games have doubtless an educational value, and may be commended to those who have—perhaps only for a brief period—been obliged to forswear climbing, and to indulge in 'the regrets of a mountaineer.' The new generation of Alpine climbers will certainly have great educational advantages, and it may be hoped that they will duly profit thereby. W. A. B. Coolidge.

Mountain Midgets, or Thirty Years after.—'Que l'homme est petit quand on le contemple du haut de la *mère* de glace!' writes M. Perrichon at the Montanvert in the popular French play. Undeterred, it would seem, by all that befel that worthy 'père de famille' in consequence of his literary indiscretion, some 'censor castigatorque minorum' among climbers has, it appears, ventured to elaborate into a series of couplets the sentiment concisely expressed by his predecessor. Rhymes under the above title, purporting to have been copied from the strangers' book in a well-known mountain resort, have been sent to us. To Alpine Clubmen, who, of course, have none of the foibles herein depicted, this careful and appreciative study of those who burlesque them, the annually increasing tribe of British Tartarins, ought to be welcome.

But a warning to contributors may be needful. The admission of this effusion must not be taken to imply that our pages are henceforth open to receive poetry. It is not for their rhythmical form, but for their moral and didactic worth (apart, perhaps, from some individual prejudices) that we give a page to the following lines:—

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TO MY FELLOW-GUESTS.

I was with the men who conquered all the Alps, and, climbing higher,
Watched, from Caucasus or Andes, Phosphor soaring like a fire;

But, successors of De Saussure! You, presumably with souls,
Who treat Heaven's nearest neighbours as the pit-bear treats his poles,

Show your foolish 'forms' upon them, 'cutting records' as you run,
Craving of a crowd that jeers you notoriety—your bun!

You, who love an 'Alpine Centre' and an inn that's full of people,
Where the tourists gape in wonder while their Jack beflags his steeple:

Lads, whose prate is never-ceasing, till the *table d'hôte* is crammed
With the *gendarmes* you have collared, and the *cols* you've *spitzed* or *kammed*!

Not for you the friendly *Wirthshaus*, where the *Pfarrer* plays the host,
Or the vine-hung *Osteria*, where the bowls go rattling most;

Not for you the liquid splendour of the sunset as it dies,
Not for you the silver silence and the spaces of the skies,

Known of men who in the old time lodged in hollows of the rocks,
Ere those Circe's sties, the Club-huts, harboured touristdom in flocks.

There you lie beside your porters, in tobacco fumes enfurled,
And think more of cold plum pudding than 'the gleaming of the world;'

There you ponder with your fellows on the little left 'to do,'
Plotting darkly Expeditions that may, partially, be New;

Boasting lightly, while the brightly-beading Bouvier brims the glasses,
How you'll romp up avalanche tracks, and you'll rollick in crevasses;

Dreaming fondly of the glory that such 'azure feats' must get,
When your guide narrates the story in the 'Grindelmatt Gazette;'

Gloating grimly on the feelings Hobbs and Nobbs will strive to smother
When they learn the Gross Narr Nadel has been just bagged by another—

Hobbs and Nobbs, who, slily stealing to our Grün Alp telescope,
May find solace in revealing how you faltered on the rope.

Mountain Midgets—thus I hail you—who to littleness your own
Fain would drag down Nature's Greatest, leave earth's minster-spires alone!

Yet in vain an old man preaches. What is brought must still be found,
Still the raw, relentless athlete make the Alps his running-ground,

Still the Greater breed the Lesser on through infinite degrees,
And the mountains have their Midgets—as the glaciers have their fleas.

MR. H. G. WILLINK'S ALPINE SKETCHES.—The exhibition of these drawings, recently held in the Club Rooms, has enabled lovers of Alpine pictures to make a better estimate than before was possible of the capacities of Mr. Willink as an Alpine artist. The drawings exhibited by him at the annual winter collections at Willis' Rooms have attracted considerable attention, owing to the fact that, for the most part, they have dealt with a series of subjects previously neglected by

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the painters who go among the Alps. Mr. Willink studies not so much mountains as mountaineers. He sends indeed a few pictures of mountain scenery, pure and simple, such as his view of the *Fletschhorn* or his *Sunset from the Old Matterhorn Hut*; but these cannot, of course, take rank with the works of Loppé, Croft, or Donne. His incidents of mountaineering adventure suffer from no such dangerous rivalry. They are entirely new and original, and as such they have already won a remarkable popularity. The best of them are certainly the monochrome drawings. Their excellence is due to the fact that the artist knows how to attract attention to the figures, and to keep the eye fixed and interested in their action. The party crossing the *Bergschrund* may be quoted as an example. It would be idle to contend that the painting of snow is by any means faultless, but it is quite good enough as accessory and background to the figures, and every climber will feel so interested in observing the truthfully rendered struggles of the man on the snow-bridge that he will have no attention to spare for the details of surrounding nature. *Ware Stones, Cutting away the Cornice at the Top of the Dru Couloir*, and *Cutting Steps across a Snow-slope*, all give rise to similar observations. One of the best of the series of monochromes is the *Party Crossing a Moraine* by faint dawn and lantern-light. This we are glad to know has been presented by the artist to the Club. It proves him to be possessed of a remarkably quick observation, manifested in this case by the not obtrusive but still true rendering of the easy and certain pacing of the guides and the stumbling hesitancy of the gestures of the amateurs. In the *Ulrich Almer on the Gabelhorn* Mr. Willink has attempted to bring before the eye one of the most stirring episodes of historical mountain adventure. It is a bold, and on the whole a successful, attempt. It manifests a considerable power of imagination, the solitary gloom of the wild surroundings being well in harmony with the desperate energy of action of the solitary figure. The attitude seems to be truly conceived, and it must certainly have been a difficult one for an artist to evolve without the possibility of experimenting upon models. Besides the more careful and finished drawings, the collection included several frames filled with swiftly executed sketches. Some of these are remarkably good. We may mention as examples *Above the Tschingeltritt in* 1886, and *Snowdon from Moel Siabod.* We trust that Mr. Willink may be encouraged to devote himself with increasing skill to a branch of art which he has been original enough to invent for himself. An illustrated volume of incidents in mountaineering, from the early start to the last rest on the descent, would doubtless attain success even in the present over-written days. Mr. Willink is rapidly bringing together materials for such a work. W. M. C.

New Catalogue of the Alpine Club Library.—A new edition of the Alpine Club Library Catalogue is now ready. It has not only been completed by the addition of books acquired since the catalogue was first printed in 1880, but revised and improved in other ways.

1. The publications of the various Alpine Clubs are now arranged in a systematic manner.

2. Endeavour has been made to assign anonymous and pseudo-

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nymous works, so far as practicable, to their real authors; and, where the same author's name occurs in different forms (French, German, or Latinised), to collect all his works under the best known form of the name.

3. An index of subjects has been added, which, it is hoped, will facilitate the use of the library.

The obligations of the Hon. Librarian to several members of the Club in the preparation and revision of the catalogue are recorded in the prefatory advertisement. Corrections and suggestions for improvement in any future issue will be thankfully received by the Hon. Librarian.

ALPINE CLUB RELIEF FUND.—Since the publication of the first subscription list in the 'Alpine Journal' (May 1888) the following additional subscriptions, amounting to 115*l.* 16*s.*, have been received:—

	£	*s.*	*d.*
John Ball, Esq.	2	0	0
George Bennett, Esq.	1	1	0
H. Entwistle Bury, Esq.	1	1	0
A. J. Butler, Esq.	1	1	0
G. Chater, Esq.	2	2	0
Major E. Clayton, R.A.	1	0	0
E. Dent, Esq.	3	3	0
H. Fox, Esq.	3	3	0
R. Hughes, Esq.	3	3	0
C. W. Mead, Esq.	1	1	0
Sir G. R. Osborn, Bart.	1	0	0
Rev. T. H. Philpott	1	1	0
J. H. W. Rolland, Esq.	1	1	0
F. W. Saunders, Esq.	2	2	0
G. Scriven, Esq., M.D.	1	0	0
J. W. Garrett Smith, Esq.	5	5	0
W. Trotter, Esq.	5	5	0
F. F. Tuckett, Esq.	2	2	0
W. Williams, Esq.	5	5	0
G. Yeld, Esq.	1	1	0
B.	10	0	0
M. K.	10	0	0
Miss Dent.	5	0	0

	£	*s.*	*d.*
The Very Rev. the Dean of St. Paul's	5	0	0
P. Marriage, Esq., and Miss Marriage	5	0	0
H. V.	5	0	0
G. R. Copeman, Esq.	3	3	0
Sir Alfred Dent	3	3	0
Mrs. Hughes	3	3	0
R. Twining, Esq.	3	3	0
Rev. E. C. Wickham.	3	3	0
J. B. Carrington, Esq.	2	12	6
Rev. H. West	2	2	0
Mrs. Abbott	2	2	0
Miss Pigeon	2	2	0
E. M Courtney, Esq.	1	1	0
A. Loughborough, Esq.	1	1	0
R. T. Walker, Esq.	1	1	0
F. H. B. Daniell, Esq.	1	0	0
G. A. Solly, Esq.	1	0	0
The Misses Talbot	0	10	0
The Misses G. Clark	0	10	0
Miss Colvile	0	10	0
A Curate	0	5	0
G. P.	0	5	0
M. S. G.	0	2	6

The fund is now closed. It amounts altogether to 534*l.* 12*s.* 3*d.*, all of which has been received: 280*l.* was sent out in April under the conditions named in the last number of the 'Alpine Journal.' A further sum of 100*l.* has been sent to the Central Committee of the Italian Alpine Club, and 100*l.* to that of the Swiss Alpine Club. The expenses of printing, advertising in the 'Times,' &c., will amount to about 10*l.*, leaving a sum of about 44*l.* 12*s.* 3*d.* still in hand.

Letters acknowledging in the warmest terms the sympathy and assistance rendered to the sufferers through the action of the Alpine Club have been received by the President from Herr Gallati, President of the Swiss Alpine Club, and Signor P. Livry, President of the Italian Alpine Club, as well as from other gentlemen connected with the distribution of the fund.

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IN MEMORIAM.

HERR EMIL BOSS.*

Our readers will learn with feelings of regret, that will be shared by all mountaineers and visitors to the Bernese Alps, the death at Grindelwald, on July 1, of Herr Emil Boss, aged 36, resulting from an attack of brain fever, following on a long, though intermittent, illness.

Emil Boss was well known as the fourth of the worthy family of brothers who have now for many years acted as hosts at the sign of 'The Bear' at Grindelwald. He was still better known, and will be long remembered, as one of the most skilful and adventurous not only of Alpine climbers but of mountain explorers. Tall and powerful in frame, with a fresh open countenance, an expression full of life and energy, and at ordinary times a gentle, kind manner, he stood out—the handsomest of a good-looking family of thirteen—a remarkable personality among the sturdy, weather-beaten, yellow-faced figures of the Bernese highlanders who gather round his father's door.

As a climber Emil Boss had great strength, agility, self-confidence, almost unlimited powers of endurance of cold and hunger, as well as the higher capacities of the mountaineer, the instinct of path-finding and the judgment which varies a route according to the temporary conditions of rocks and ice. In the Alps in chamois-hunting, in winter climbing, in any form of adventure which struck his fancy as out of the commonplace, he had often proved his powers. He was never so happy as on the snows, and, keen sportsman as he was, would often, when out with his brothers, insist on going up beyond the haunts of the game, simply for the pleasure of going up. He had the true mountain passion, and the rarer air seemed to steady the too excitable nerves on which the smoke and crowd of cities acted (as he once said to me) as a poison. In New Zealand, in 1882, in the first ascent of Mount Cook with the Rev. W. S. Green, in the Himalaya, in 1883, with Mr. W. W. Graham, Boss showed in camp and on the mountains (as both travellers have borne emphatic testimony) all the qualities of a first-rate mountaineer, a hardened explorer, and a cheerful and resourceful companion.

This faculty of cheerfully accepting and confronting the ordinary hardships of travel in a strange and wild country is rare among Alpine guides. To the uneducated the unknown is always terrible. The familiar perils of the snow world guides are ready enough to face, but the prospect of encountering strange people, lands, and seas fills them with apprehension. Even when persuaded to face an exploring journey Swiss peasants do not as a rule take kindly to the task. They miss

* For any inadequacy in the following notice I owe an apology to the readers of this Journal, and in particular to the more intimate personal friends of Emil Boss. In the absence in the Rocky Mountains of the Rev. W. S. Green, and the difficulty of communicating at short notice with other members of the Club after I had left England myself (having, as I hoped, fulfilled my promise to the Editor to see the present number through the press), I have had to do my best, where another might easily have done better.—D. W. F.

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the cheerful guides' room after their day's walk, the scarcity of stimulants depresses them, they are bewildered by the requirements of tent life, and before the snow-line is reached their energy is more than half spent. Many good guides have—in no way to their blame—declined to go beyond the Alps. Others, when brought face to face with their work, have found reasons, which seemed to them sufficient, for turning back. Emil Boss, not being himself a guide, went out with Ulrich Kaufmann to join Mr. Graham in India because no leading guide at Grindelwald would go so far alone. He had the advantages not only of his venturesome temperament, and of long experience in rough travel, but also of belonging to a family of superior position and education. And he had also the first requisite for the mountaineer who would attack the heights of the Himalaya, the faith which masters mountains. Emerson's sentiment—

> Well I know no mountain can
> Stand before the perfect man

must be the explorer's conviction. In this spirit Balmat conquered Mont Blanc, and the Carrels the Breil face of the Matterhorn. This was the spirit of the two best climbers who have yet been to the Himalaya —Andreas Maurer and Emil Boss. Maurer said to me one day shortly before his death, in reply to a question about Kinchinjanga, 'Where the clouds go men can go; but they must be hardy men.' Emil was fortunate in having a companion of almost equal hardihood, and he and Mr. W. W. Graham accomplished enough together to encourage others to attempt to follow, and even to go beyond, their footsteps.

Two bunches of Edelweiss, gathered by Boss in New Zealand and the Himalaya, hang framed together in our own clubrooms, and will serve henceforth as a modest but appropriate memorial of the Swiss mountaineer who first carried ice-craft into the mountains of Asia and the Antipodes.

On Boss's return from India I had frequent and close conversations with him in the map-room in Savile Row, and I can truly say that I have never met with a traveller better able than he was at that time to point out intelligibly and precisely on maps where he had been, and where and how the topographical details of the survey failed to correspond with those of the locality. This talent may seem humble enough; but, as Mr. John Ball long ago pointed out—and successive Editors of the 'Alpine Journal' are in a position to confirm the statement—it is a talent shared by but a comparatively small proportion of our members. For his leading part in these two expeditions Herr Emil Boss was very properly distinguished by receiving one of the Honorary Awards of the Royal Geographical Society.

This is not the place or occasion to repeat the details of journeys but recently recorded; and in Emil Boss the man himself was more interesting than his deeds, extraordinary of their kind as these often were. It was impossible to be long in his company without feeling that in him a nervous, imaginative nature, capable of rising to great emergencies, was chafing against the bonds of circumstance. His quick eyes and gestures, his vivid and forcible talk, were constantly vehicles for the expression of an inward unrest. Those who met him for the first time

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were apt to feel like the Wedding Guest in the poem. They could hardly believe that their new acquaintance was a native of Grindelwald and one of a family of Swiss innkeepers. He seemed rather an adventurer strayed out of the Elizabethan age, one of those eager spirits who sailed the Spanish Main under Drake and Raleigh. Emil would have been happiest in some Great Adventure—such as there are in this time—of African discovery or Polar exploration. Fate placed him in youth in a position in life in which the office of steward on a French ocean-going steamer was the readiest gate to distant travel. As soon as the winter snows covered his native valley in their white monotony he would disappear, like the birds-of-passage, to some far-off and uncertain part of the globe. Previous to his two mountaineering journeys he had been in Australia, South America, North Africa, India. In several cases he left his ship and penetrated far into the interior; how far it is impossible now to say. But in spring he generally returned to his home with strange stories of many lands. In the course of these wanderings he made himself an excellent linguist. And in many other directions he had, from the time when, as a boy, the village schoolmaster found he had no more to teach him, natural capacities beyond his fellows. He possessed, besides, an amiable and generous character, which helped to make him the favourite son and brother in a large and attached family, and now adds keenness to the sense of their loss.

Of late years the increasing responsibilities attendant on the success of 'The Bear' kept Emil Boss much at home. After his journey in India—there seems no certain reason for saying in consequence of it—symptoms of abnormal brain excitement, coupled with intervals of melancholia, showed themselves from time to time, and caused much concern to his friends. Last winter, however, he seemed to be more himself, and he took a leading part in much of the winter climbing, of which Grindelwald was the centre. At the beginning of the summer he went to Meiringen as the manager of the 'Wilder Mann.' There he felt ill and depressed, and in the last days of June returned to his old home on a visit; returned, as it proved, to die. In his death we lament the loss of an original and fascinating character, as well as the premature cutting off of a mountaineer who, with ampler and kindlier chances, might have carried man's highest on the mountains even higher than he did.

D. W. F.

NOTICES.

Die Berge am Vierwaldstättersee. Von G. A. Türler. (Lucerne: Doleschal, 1888. 3f.)

ARDENT mountaineers will scarcely choose as the field for their activity the comparatively low ranges surrounding the Lake of Lucerne. Less ambitious travellers, and those who like lake views and autumn rambles will find Herr Türler's book of considerable use. It describes systematically all the hills and ridges around the lake, giving in each case concise directions as to the route, times, inns, &c. The Rigi and

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Pilatus are naturally treated at length, but the Bristenstock, the Rothestock, and the giant of the district, the Titlis, are by no means passed over. The botanical and geological characteristics are indicated with some fulness, and considerable space is devoted to picturesque descriptions of footpaths, in many cases probably unknown to foreign visitors. Scattered through the work, we find a number of woodcuts, illustrating Swiss life, which are rather of the romantic type, though they do not make out that Swiss herdsmen are like Arcadian shepherds or that Swiss mountains are always snow-covered and hidden in the clouds.

Guia Itineraria de las Serras de la Costa de Llevant ó sia del Besós al Tordera. Por Arthur Osona. (Barcelona: 1888. 16mo. 1*s.* 6*d.*)

Guia Itineraria dal Vallés Superior ó sia del Congost al Llobregat. Por Arthur Osona. (Barcelona: 1888. 16mo. 1*s.* 2*d.*)

Guia del Alt Plá de Barcelona y del Baix Vallés. Por Arthur Osona. (Barcelona: 1888. 16mo. 10*d.*)

These three neatly got up little guide-books form part of the series which is being compiled by the indefatigable Señor Arthur Osona, and issued by the Associació d'Excursions Catalaná, better known to foreigners as the Barcelona or Catalan Alpine Club. Complete ignorance of the districts therein described prevents us from criticising or examining the subject-matter of these booklets. The method of description adopted seems to be well chosen and carried out, and the books themselves—one of which is barely more than a pamphlet—will doubtless be essential to all who meditate a visit to Catalonia, though there are no maps of any kind attached to them. The tongue in which they are written is the Catalan dialect, which can be made out without much trouble by anyone moderately acquainted with any of the great Romance languages. We trust that some members of the Alpine Club will profit by the information given to travellers by Señor Osona, and will not merely visit Catalonia, but describe its mountains in the pages of the *Alpine Journal.*

Der Turist in der Schweiz. Von Iwan von Tschudi. 30th edition. (Zürich: Orell, Füssli & Co. 8f. 50c.)

We are very glad to find that this well-known guide-book will still be published, despite the death of its original compiler. The well-known Zürich firm of Orell, Füssli & Co. have undertaken the publication, and propose to keep it up in future years. In the present edition the omission of the notices of the several cantons in the introduction, and of the railway maps (which may, however, be obtained separately) at the end, have reduced the bulk of the volume, and still more its price. The text is stated to have been carefully revised, but there are certainly some considerable changes which have not been noticed, and it seems as if the chief new ascents of 1887 had not been entered in their proper places. The work of keeping up such a tightly packed volume to some approximate accuracy must be very great, and we are well pleased that the 'Turist' will still be the companion of numberless travellers in Switzerland. The new edition appears in a plain red cover, the delightful picture of former editions having been dispensed with.

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Flora von Bern. Von L. Fischer. 5th edit. revised. (Bern: Huber, 1888. 4f.)

Prof. Fischer of Bern has recently published a monograph (price two francs) on the vascular plants of the Bernese Oberland. His publishers have now issued a fifth and revised edition of his 'Flora' of the district around the town of Bern. It is based entirely on his own personal investigations and those of other trustworthy botanists, but he has not neglected to consult all the more important and more general botanical works in which information on the Bernese flora was likely to be found. In his present volume, of about 300 pages octavo, he describes the plants in a concise and systematic way. The number of species catalogued is no fewer than 1,041, of which 891 are phanerogams. There are, however, only fifty species which can in any sense be said to belong to the flora of the neighbouring Oberland district, so that the book will chiefly interest those interested in the Swiss flora generally, not necessarily the strictly Alpine plants only. A transfer from the Siegfried Map and a careful index complete a work which will commend itself to those of our readers who visit Switzerland, not only for climbing, but also for more purely scientific pursuits.

PROCEEDINGS OF THE ALPINE CLUB.

A GENERAL MEETING was held in the Club Rooms on Tuesday, May 1, Mr. C. T. DENT, *President*, in the chair.

The CHAIRMAN introduced to the meeting the Chief Justice of Hyderabad, who was present as the guest of Mr. H. S. King, M.P.

The CHAIRMAN stated that the subscriptions to the Alpine Club Fund for the relief of the distress caused by the avalanches in the Alps had now reached a total of about 460*l.*, of which 200*l.* had been sent to the President of the Italian Alpine Club, 40*l.* to Herr J. Seiler for the Zermatt valley, and 40*l.* to Rev. J. C. W. Tasker's committee for the Saas valley (see p. 66).

The CHAIRMAN then called on Mr. H. S. KING to read his paper on 'Three New Ascents in the Bernese Oberland,' at the conclusion of which Mr. J. T. WILLS (who had climbed the Eiger Hörnli the day after Mr. King) said it certainly was not easy, and it would be hard to guess the right way up, except when snow lay in the gullies. The chimney was very difficult, but would be easier when the rocks were dry. He thought the next peak on the ridge would be worthy of notice.

Mr. SCHUSTER wished to know if Mr. King could understand the Swiss Federal Map of the Jungfrau and Silberhorn; it was apparently misleading. He considered the Roththal Hut was in the finest situation of any hut in the Alps. The Silberhorn could be reached from it in seven or eight hours.

Mr. KING, in reply, said he went up first and studied the map afterwards. He was so puzzled by it that he thought considerable alterations must have taken place from changes in the glacier. He strongly recommended a repetition of the climb with map in hand.

The CHAIRMAN said that, to judge by the discussion, Mr. King had broken decidedly new ground. The Silberhorn appeared to be very little known, and the glacier changes taking place there were well

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worthy of study. It would be a reproach if the map were to remain inaccurate.

A vote of thanks to Mr. King was carried by acclamation.

A General Meeting was held in the Club Rooms on Tuesday, June 5, Mr. C. T. DENT, *President*, in the chair.

Mr. H. REMSEN WHITEHOUSE and Mons. FRANÇOIS HENRI DUNOD were balloted for and elected members of the Club.

The CHAIRMAN stated that since the last meeting 100*l.* had been sent from the Alpine Club Relief Fund to Mons. Gallati, President of the Swiss Alpine Club, leaving a sum of a little over 100*l.* still in hand. He also said that an appeal had been made on behalf of the village of Schwanden, near Meiringen, which had recently been entirely destroyed by inundations, in order to enable the inhabitants to migrate elsewhere. The Committee, however, considered that the Avalanche Relief Fund was not applicable to the case of Schwanden.

Mr. POLLOCK said that neither the Committee nor the present Meeting had the power to apply the Fund to any other than its original purpose without the consent of every subscriber.

The CHAIRMAN then called on Mr. ECCLES to read his notes on Lightning-struck Rocks. Mr. ECCLES illustrated his brief paper by a series of curious specimens of rock, portions of which had been more or less completely vitrified by lightning.

Remarks were made by Mr. HOLZMANN, Capt. MARSHALL HALL, Mr. D. FRESHFIELD, Mr. BUTLER, Major MARRIOTT SMITH, and Mr. ELLIS CARR on various effects of lightning noticed by them.

The CHAIRMAN said that the specimens shown by Mr. Eccles were very remarkable, and quite new to most members present. The whole subject of lightning-stroke was very imperfectly understood; some good examples of its effects had lately been shown at the Meteorological Society. He proposed a cordial vote of thanks to Mr. Eccles, which was carried by acclamation. Mr. ECCLES having briefly replied, the CHAIRMAN said it was a charming contrast to turn from these mighty effects of nature to the admirable works of art exhibited in the room. He would take the opportunity of congratulating Mr. Willink on the admirable show of pictures he had contributed (see p. 64).

The proceedings then terminated, and Mr. Willink's unique series of sketches—over 60 in number, which were arranged on screens and on the walls of the room—were examined with great interest.

The exhibition remained open to members and their friends daily until June 26.

The Summer Dinner took place on Thursday, June 7, at the Queen's Hotel, Richmond, and was attended by thirty-eight members and their friends.

Errata.

Vol. xiii. p. viii. List of Illustrations, *for* 'Ushba from the path between Adish and the Mujalaliz' *read* 'between Latal and Betsho.'

„ „ 371, footnote. According to private letters of M. Lerco he failed on Elbruz, but reached the summit of Kazbek by a new route up the face seen from the Post Station, descending by the same route as Mr. Freshfield's party in 1868.

„ „ 511, footnote, *for* 'Suanetiens' *read* 'Imeritiens.'

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THE AZEROU TALETAT *From a Photograph*
(6370 FEET)
IN THE JEBEL JURJURA

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THE

ALPINE JOURNAL.

NOVEMBER 1888.

(No. 102.)

Across the Kabyle Highlands.

By F. F. TUCKETT.

(With a Note by Douglas W. Freshfield.)

A FEW notes on a recent tramp amongst the mountains and valleys of the Kabyles may possibly interest some readers of the Alpine Journal as supplementing those furnished by Mr. D. W. Freshfield under the heading of 'An Ascent in the Lesser Atlas.' These, which appeared in the number for August, 1886,* were the stimulus to my own little expedition, and I hope that a brief description of the latter may, in its turn, help to incite other visitors to Algeria to include this charmingly picturesque district in their tour.

After five weeks spent in the Canaries, and two or three in southern Spain, I crossed from Malaga to Oran, and thence made my way *viâ* Tlemçen, Miliana, Hammam R'hira, and Blidah to Algiers, where I communicated my plans to our well-known and most courteous and accomplished Consul-General, Sir R. Lambert Playfair, K.C.M.G., whose house is a focus of all that is interesting and hospitable in that city. On mentioning that I proposed to make a walking tour of two or three days through the mountainous country north of the Jurjura range between the Oueds Sebaou and Sahel, and over a portion of the route followed by Mr. Freshfield, he strongly advised me to devote a little more time to the expedition, and aim rather at covering fresh ground, or ground which at least had not been traversed, he believed, by Englishmen since his own journey in 1875, described in the fourth chapter of his 'Travels in the Footsteps of Bruce.'

Gladly adopting the friendly counsel of such an authority, I proceeded through the night of April 15 to Menerville and

* Vol. xiii. pp. 40, 41.

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Tizi-Ouzou by a diligence whose *intérieur, banquette,* and roof were occupied by some twenty-five Kabyles returning to their native hills for the haymaking season. Tizi-Ouzou was reached in 13½ hours at 6.30 on the following morning, and then came an uphill drive in an omnibus of nearly five hours, involving an ascent of some 2,200 feet, to Fort National, situated at an elevation of 3,005 feet upon the new road which is in course of construction, and is expected to be completed before long, across the Jurjura by the Col de Tirourda to Beni Mansour in the valley of the Oued Sahel. The morning was wet, but there was a temporary lull in the steady and rather hopeless-looking downpour in the course of the afternoon, which permitted a stroll, and enabled me to get some lovely glimpses of the extraordinary and complicated system—characteristic of the scenery of all this region—of valleys and ridges crowned by picturesque villages whose red-tiled roofs occasionally caught fugitive gleams of sunshine. Soon the mists closed again round the mountain fortress, and still wrapped it in their folds on the morning of the 17th.

The day, however, gradually improved, and, determined not to lose it in inaction, I set off at noon up the high road with a Kabyle guide, named Mohammed Naït Si Umahad, and a mule for my baggage—a Spanish *alforja*—our destination being Aïn Hammam, twenty kilomètres distant and a walk of three and a-quarter hours. An establishment frequented principally by people connected with the works of the new road, and called 'Hôtel des Touristes,' furnished humble but adequate accommodation, and, as the sky cleared and the setting sun gilded some twenty-five villages, seated astride of the crests and ridges, and gave hopes of a return to settled weather, my spirits rose and I slept in peace, disturbed only at times by the snoring of a road inspector who shared my bedroom.

On the 18th I awoke to a cloudless sky and superb view of the noble range of the Jurjura, now for the first time fully visible, as it stood out with marvellous sharpness after the rain, sparkling in the morning air, and clad with an amount of snow which gave it the appearance of a much greater elevation than it can really lay claim to, its loftiest point, Tamgout Lalla Khadija, being only 2,308 mètres (7,572 feet) in height. The keen, clear mountain air was most refreshing and stimulating, and at six I was off in high spirits. Further on there was a point on our route from which I counted fifty-six villages all visible at once. The landscape

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reminded me irresistibly of a bit of Corsica, and more especially the district of La Castagniccia, the similarity of position in the villages of the two countries being probably due to the same reasons—greater salubrity and defensibility—and perhaps most of all to the absence of suitable sites on the steep slopes and in the narrow bottoms of the deep ravines, where the river-bed often constitutes the only level space. The bright green of the young barley was exquisitely beautiful and refreshing to the eye, and olives, ashes, evergreen oaks, and fig-trees added richness and charm to the smiling landscape.

We followed the well-engineered new road for about seven kilomètres and then, instead of proceeding up it to the *maison cantonnière* at the northern foot of the Col de Tirourda, and thence *viâ* Soumar, as Colonel Playfair's party did in the reverse direction, we struck off to the left by a good bridle-path, skirted the flank of an ilex-covered hill, and reached a picturesque but filthy Kabyle village on the further shoulder. A descent of some 1,600 feet by a rough track winding down amongst huge olives and amidst the richest verdure, brought us to a torrent, which was forded by the help of the mule carrying my *alforja*. Then followed a somewhat similar ascent on the other side, during which a halt was called for a second breakfast in a charming nook close to a welcome spring. Lively parties of Kabyles with donkeys, mules, sheep, and cows passed us on their way to a village market, and all greeted me with a friendly *bon jour*, which I fancy was, in many cases, the limit of their knowledge of French.

Then we went on and up to a most picturesque place—but dirty as all the Kabyle nests are in this the district of the Zouaouas (whence Zouave is derived)—Ti-Filkouth, dropped down 500 feet or so a second time to another stream, and then mounted steadily through delicious lanes beneath shady ashes, olives and ilexes, to Aït Aziz and the Col de Chellata (4,905 feet), a pass over the Jurjura further to the east than that of Tirourda, and commanding a splendid profile view of the range which Colonel Playfair considers to be scarcely equalled in all Algeria. A short distance below on the further or eastern side was a copious spring of delicious water, at which we halted for a meal, and were joined by various bands of passing Kabyles with their flocks, some of them really grand-looking fellows. My guide subsequently got rather confused about the track, which split up into several smaller ones, and certainly was puzzling; but after some *détours* we came out all right, and reached the military post of

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Akbou in the valley of the Oued Sahel at five, where I found very comfortable quarters in a little *café* with a dash of inn about it.

Mohammed my guide, who was of the Zouaoua tribe, had proved a very decent fellow, walking excellently, and speaking French with ease ; but on proceeding to discuss arrangements for the morrow, I was surprised to find him averse to going on with me to Bordj-bou-Arreridj through the country of the Beni-Abbas on the other or eastern side of the valley of the Sahel, on the ground that, though he would be safe in my company, he might probably be attacked on his return, and, at any rate, have his mule stolen. Finding that this view was confirmed by the people at Akbou (as it subsequently was by the *garde forestier* at Bordj Boni), I agreed to release him from what I had supposed to be our original arrangement, and secured instead a mule from the village, and a powerfully-built negro, Lakdar Ben Mohammed, who was recommended as the strongest man in those parts, and as such well known and feared.

So at seven on the 19th we started for Bordj Boni, a sort of mountain fort, *maison forestière*, and farm combined, *viâ* Ighil (pronounced Iril) Ali, which, with Tizairt and Azrou, forms the largest village group in Kabylia. The day was superb, and I looked forward with much interest to visiting the little frequented region before me. Soon after quitting Akbou we passed on an isolated conical hill a large Roman tomb, which is very conspicuous for miles around. Traversing the flat valley bottom for a couple of hours, and crossing the river, which, though nowhere deep, was of considerable width, we ascended over undulating ground covered extensively with olives, passing quaintly-perched villages surrounded by a dense growth of cactus traversed by a single path, which would offer serious obstacles to an attacking force. Behind us the view of the plain in its brilliant spring greenery, backed by the snow-clad peaks of the Jurjura range, became increasingly beautiful as we ascended. The ground often seemed very arid, but showed evidences of industrious cultivation, though a better supply of water is required to make it really productive. The villages are in every way superior to those north of the Jurjura, many of the houses being two-storied and of much better construction, with some attempts at architectural effect and, occasionally, arcaded fronts which look very effective and relieve the uniformity. Unlike those of the Zouaouas, the roofs are dullish in colour instead of red, which of course dimin-

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ishes the picturesque effect, but nothing can detract from the charming position which they occupy. This was the season of oil-making, as it seems that the olives produce a much larger quantity after being kept through the winter, and I saw the rather grimy operation going on in more than one place.

At eleven we reached a sort of sloping isthmus between the two great villages of Ighil Ali and Tizairt, separated by an interval of scarcely 200 yards, and halted at a *café* till 12.20. From thence the road wound up past weird rocks and gorges and along the face of the hill behind, commanding splendid views, and then, crossing a col over a spur, we traversed a sort of rolling plateau the soil of which was almost perfectly bare of all vegetation except Aleppo pines, evergreen oaks, and fine oleanders wherever streams appeared. The rock formations were most curious, sometimes resembling the vertebræ of fishes sticking out of the ground, or arranged staircase fashion, and at others set perpendicularly on their edges like gigantic lumps of streaky bacon. In places we went along through the bottom of a sort of gutter, only a foot or two wide, worn deeply in the soil by ages of traffic and the action of water, the steep sides cutting off all view; and in such a spot, near the village of Mouka, the *garde forestier*, my host of that night, told me that assassinations were frequent, the Arabs coming up and waylaying and murdering the Kabyles for the sake of their mules.

At last we came in sight of the Bordj, high up in the pine woods to our left, but what with descents into hollows and all sorts of twists and turns, not to mention the considerable altitude to be attained (for the fortified enclosure, or 'Bordj,' of Boni is some 3,800 feet above the sea), the ascent seemed endless. However, when at last I arrived, I had the heartiest possible reception from the excellent Corsican *garde forestier*, Rinucci, who made me promise to stay two nights, in order thoroughly to see the extraordinary Kabyle village and mountain fortress of Gelăa (or Kalăa), some distance to the north. He was delighted with my praise of his native land, and pleased to find that I knew his village and neighbourhood; but the establishment was not in exactly the most fitting state to receive a guest, as the poor wife, besides suffering sadly from toothache, was momentarily expecting her confinement, and an Italian woman of Serravezza, who had come up to assist from Ighil Ali with her husband and a sickly squealing child, was down with intermittent fever; whilst, out of doors, a panther had taken the

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opportunity to make a raid on the sheep, and when they were shut up in the courtyard at night could be heard, in spite of the fury of the dogs, growling and clawing at the doorway! Poor Rinucci seemed sorely beset, and I believe it was a real relief to him to have some one to sympathise and talk to. I was also able to be of some practical use by prescribing cotton wool soaked in whiskey for the wife's tooth, and supplying a dozen quinine pills to the sick Italian, the benefit of which was already apparent before I left; whilst magnesium wire, conjuring tricks, &c., helped to keep the children quiet, and were not despised by their elders or the Kabyles, of whom one or two families had quarters in the enclosure.

To my surprise I learned that, besides wild boars, which abound in the ilex woods, and panthers, which are the most dangerous of all the wild beasts of the country, sometimes even attacking men, lions still exist in this particular district, and Rinucci informed me that one was seen only two days before in the pastures, some 300 yards distant. I suppose there can be no doubt of the fact, but somehow the larger and rarer *feræ naturæ* seem to have a bad habit of putting in an appearance a day or so before the arrival or after the departure of a stranger. A dead donkey, as a decoy for the panther, lay 100 yards from the house opposite a small *gourbi*, or hut, with a couple of holes for shooting through, and an Arab was stationed there that night, and saw and fired at but missed the beast, who, however, was so bold that he returned after the man had left, and tore off the hind legs of the victim, as I saw next morning. The position of the Bordj, on a lofty plateau surrounded by forest and commanding a superb view of the Jurjura, is very fine and the air keen and healthy.

All retired for the night about nine, but, so far as I was concerned, it proved by no means a restful one. A bed had been made up for me in the kitchen, between the room occupied by my host and his wife and that given up to the Italians, and a big Italian boy and two puppies lay on the floor. The watch-dogs barked furiously at short intervals, at any rate during the earlier portion of the night; cows gave expression to their feelings; sheep and goats cleared their throats; two geese shrieked out of tune; the lad snored prodigiously and then choked, going off like a geyser at irregular intervals; the two puppies apparently spent most of the night in licking themselves or one another; and the baby yelled, whilst its father and mother sang to it by

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turns! I never remember such a discord, but I dropped off at last, and contrived to repeat the process when again and again roused.

I was glad to turn out at six on the morning of the 20th into the clear, fresh, frosty air, and get a good wash, and then my host dismissed my negro and mule, promising to supply substitutes the next day, and at 7.45 I started with a Kabyle —a young married gentleman of twelve!—to pay a visit to Hamed Ben Mouzian, the great Sheikh of Geläa, who is a man of much influence throughout the district. It seemed odd to have such a lad for protector in this out-of-the-way region, but, though we passed by most extraordinary paths through the wildest and most lonely scenery, and met troops of natives, I felt as perfectly safe as if I were in the Alps.

It is a really marvellous walk of $1\frac{3}{4}$ hours by narrow ridges and tracks carried along precipitous slopes of rock of fantastic shape, with wonderful views down into magnificent ilex- and pine-clad gorges, through one of which a wild boar scuttled out of sight far beneath us. The peaks around were of picturesque form, and glorious distant peeps kept opening out on one hand or the other, and my boy sang Kabyle songs and chattered unintelligibly to me, his knowledge of French being apparently limited to the numerals up to twenty. After various ups and downs and turnings, reminding me of the path between La Laguna and Taganana in the north of Teneriffe, we reached the highest point of the sloping cliff-surrounded plateau on which the upper and lower villages of Geläa are placed, and looked down upon them and over a wide extent of country.

Descending to the upper village, my guide took me to the large and ancient-looking *café* where the Sheikh was said to be, and there we found a grand old gentleman, who received me in the most courteous and hospitable manner. I was soon presented with a cup of delicious coffee as we sat and chatted, whilst Kabyles in their picturesque costume listened around, or played draughts or cards. The apartment was spacious—some 45 by 30 feet, perhaps—and the roof, whose timbers were blackened by age and smoke, was supported by an ilex-trunk and a thick stone column. Presently the Sheikh disappeared, but soon returned with another man who spoke French rather more fluently, and then we started for a walk to see the village rock cisterns, mosque, &c., and gazed down the great precipices upon the ravines and valleys beneath, looking like a sort of petrified sea in their strange billowy surface.

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The manufacture of burnouses is the special industry of the place, so I went to see a woman at work, and was told that it would take her forty-five days to complete one. The thinner and commoner sorts for summer use cost from 20 to 30 francs, but the finer qualities, and those of heavier substance suitable for winter wear, fetch 40 to 50, and, in exceptional cases, as much as 100. I bought a fairly good one for 30 francs as a souvenir, and it is a garment by no means to be despised for camping out. The French supply a machine-made article for 10 to 15 francs, but these have nothing like the wear of the native make. Next I was conducted to the Sheikh's house, whither he had preceded me, and saw the curious receptacles called 'Zaräas,' made of Alfa or Esparto grass, in which the Kabyles store their barley or other grain, sometimes for as long a period as 50 years, and it keeps perfectly good in the dry, cool mountain air. They are like gigantic bottles without the necks, some 10 to 12 feet high, and 5 to 6 feet in diameter, and are supported on a wooden stage, in order to keep them safe from mice, and well-ventilated and free from damp. In some houses several are met with, and I think the Sheikh had three, two quite full and the third partially so.

It became gradually apparent that the Sheikh was having a meal prepared for me, and soon an excellent soup with vermicelli and of the colour of tomatoes was served. I found that the colour and really delicious flavour were imparted by a mixture of powdered dry apricots and pepper. Good mutton was next served, and then delicious '*couscous*' with some of the soup for sauce, the *menu* being completed by a sweetmeat of honey and dates, which was more curious than nice to one who remembered Mr. Ormsby's suggestive comparison of 'cockroaches and treacle.' I gave the attendant, privately as I thought, two francs, but the Sheikh somehow found it out, and ordered him to return it. When, however, I presented the old gentleman with a genuine Norsk knife in a metal-mounted sheath, and told him that I should not have dreamt of offering *him* money for his great hospitality, but that I trusted he would accept the little offering as a souvenir, his eyes glistened with pleasure, and he at once permitted me to replace the coin in his servant's hand. On telling the *garde forestier* of this, he remarked, 'Mais, vous avez bien donné votre beau couteau à ce vieux coquin-là? Tiens! Il va faire payer à chaque maison 40 centimes pour les frais du petit déjeûner qu'il vous a offert,

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et il en retirera 100 francs, ou bien 150. Il est assez bon garçon, c'est vrai, mais il est bien fin!'

Taking my leave of Hamed Ben Mouzian, I started at 12.30, and returned to Bordj Boni at 2.15, M. Rinucci arriving a little later from an appointment at some distance, which had prevented his accompanying me to Geläa, as he otherwise would have done.

He told me that the Arabs and Kabyles cure rheumatism, even in very confirmed and obstinate cases, most successfully though in a somewhat painful manner, by a sort of modified actual cautery, and he knew of some Frenchmen who had derived the greatest benefit from the treatment. They heat a dozen of their small reaping-hooks to redness, and, rapidly and lightly touching the part affected with them in succession, afterwards apply pitch to the partially burnt or browned surface.

At night a watch was again set for the panther; but he was on his guard, and, though his growls were heard close at hand, he had not sufficient courage to venture up to the remains of the donkey. I passed a better night, as the noises were much less frequent and distracting, and I had become more accustomed to the medley, and at 7.45 on the morning of the 21st I started with an Arab and a mule, and accomplished the walk of forty-five kilomètres (twenty-eight miles) to the railway station of Bordj-bou-Arreridj, in superb weather, doing the distance entirely on foot in seven hours, including forty-five minutes' halt for luncheon. For the first hour the forest scenery was charming, but afterwards the route became comparatively uninteresting. My Arab, who was a very inferior pedestrian to Mohammed the Kabyle, complained of the rate and the distance, so I let him ride the baggage-mule from time to time, and he made himself much at home and even patronised my umbrella, whilst I tramped ahead in my shirt-sleeves to keep up the pace, as it would not have done to miss the train to Setif, there being only one in the twenty-four hours.

Thus ended an extremely pleasant little expedition, full of novelty and variety both as respects the landscape and the very interesting human element, for further descriptions of which I would refer the reader to Col. Sir L. Playfair's work already cited and Mr. Edgar Barclay's charming 'Mountain Life in Algeria.'

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A NOTE ON ALGERIAN MOUNTAINS.

BY DOUGLAS W. FRESHFIELD.

AN account I wrote of my visit in 1886 to the gorge of the Châbet-el-Akra and walk across Kabylia from Bougie to Dra el Mizan has been crowded out of the Journal by my Caucasian papers. Those who wish to know what I have to tell may find it, however, in German in the pages of the 'Oesterreichische Alpen-Zeitung' (Nos. 253 and following), from which the illustration here given is, by the courtesy of the Editor, transferred.

The following notes and itinerary may, I fancy, be of some use. I have purposely left the latter rough, so that the traveller may fill in for himself, according to local information, his day's walk. The guide-books (except 'Murray' on the routes which the author himself knows) have little to tell of the bye-ways of Kabylia, and the excursion of the French Alpine Club has not been so productive as might have been hoped, while Mr. Barclay's volume is everything that is charming, but absolutely untopographical and very limited in its field.

For a pedestrian who rides occasionally, I should suggest the following route through Kabylia: —

Train to Dra el Mizan station; drive to Borj Boghni; ascend Haidzar; descend to village at north foot of the Pass of the Ait Irguen.

Ascend Ras Timounenin and Aiguille east of it, working out some high-level route to villages of Beni Sedka.

Ascend Lalla Khadija; descend to Col de Tirourda and Aïn Hammam.

By Col de Chellata to Akbou.

Thence through *Lesser Kabylia* by Kalaa, Kherata, the noble gorge of the Châbet-el-Akra, and the heights of Babor and Tababor, with their Pinsapo pine-forests, to Phillippeville. There are two peaks named and measured on the map west of the Châbet in Lesser Algeria which would be worth visiting. The walks on the hills and promontories behind Bougie are very beautiful.

A fortnight's capital mountain-walking, one or two good rock-climbs, and even some snow glissades may thus be obtained at any time in April or May.

The map in Joanne is vague but useful. The sheets of the new survey (1 50,000), a beautiful production, may come out any day, and should be asked after. A very interesting set of photographs of Kabylia are obtainable at Algiers, or of Spooner in the Strand.

I may profitably answer here some further practical questions. What is there for lovers of fine scenery, mountain air, and exercise in Algeria outside Kabylia? How long does it take to get there? What does it cost?

The range of the Lesser Atlas contains a variety of gorge and forest scenery; but it is, I believe, for the most part second-rate—Jurassic rather than Alpine. The gorges of Blidah, the waterfalls and cliffs behind Tlemçen, are pleasant objects for a day's outing. Milianah is in as fine a natural situation as Broussa or Grasse, and its old walls are

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most picturesque. Unhappily, the French have made a clean sweep of all the architecture that may ever have been inside them. There is a fine walk from it over the Zakkar (5,185 feet) to the bathing establishment of Hammam R'hira, an oasis of roses in a broad, bare, and to me unattractive landscape. The hot springs and terraces of Hammam Meskoutin are very remarkable, resembling in character the recently-destroyed terraces in New Zealand. The Great Atlas (that is, the inner range which skirts the Sahara as the lesser does the Mediterranean, girding on the south the table-land of the Hauts Plateaux) contains near Batna the highest summit in Algeria. But its crests are tame, rising above high plains in slopes as bleak as the Grampians. Wild scenery and still wilder people may be found on their farther flanks, where they break down in red cliffs to the Sahara. A journey along the southern face from Biskra into Tunisia would be somewhat of an adventure.

The landmark of western Algeria is the Ouaransenis (6,513 feet), a huge block of limestone, which rises south of the melancholy valley of the Chelif, two days' journey from the cedar forests of Teniet-el-hâd. It appears as a massive block, with a huge dome at one end, like the Duomo of Florence. Comparatively little is known about it, and the district would be well worth visiting and describing. The neighbourhood is said to be rich in prehistoric remains.

There is a mystic range in the Sahara on the road to Laghouat, the Jebel Amour. Thither, attracted by the name possibly, went a party of the French Alpinists, but what adventures they met with we have yet to learn.

Algeria, as a whole, I picture as a country of no great beauty. Its mountains seemed to me too frequently wanting in the variety and nobility of form of those of Greece or Asia Minor. But it contains certain districts of extraordinary interest to the traveller. So long as they had to be reached in the slowest and most cumbrous of coaches it is no wonder that the distances—distances in Algeria are very great—discouraged visitors to the interior. But railroads are fast doing away with this difficulty. Kabylia, at any rate, will be encircled with rails. It is by far the most interesting and primitive mountain region within four days of London. Leaving Victoria at 11 A.M. on Tuesday, one is at Algiers to supper on Thursday, and on Friday may be discussing Kouskous with a Kaid almost within tread of the African snows. The holiday-maker may combine ten days' walking in the forests of Kabylia and some sharp rock-climbs in the Jurjura, with a peep at the Sahara, and be back at home under three weeks. The cost of a return ticket from Paris, first-class, *viâ* Marseilles, available to and from any Algerian port, is about 10*l*.

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A Day on the Aiguilles Rouges d'Arolla.

By W. CECIL SLINGSBY.

(Read before the Alpine Club, March 6, 1888.)

ONE day about the middle of August last year (1887) Messrs. W. Larden, Harry Fox, Captain Powell, Dr. Ed. Hopkinson, and I, without guides, after a weary trudge of many hours through deep new snow, were rewarded by the capital little climb up the Aiguille de la Za. Now, this was a much greater satisfaction to us than may appear at first sight. The truth is, some of us had grave doubts whether we should ever find, or at any rate reach, a top at all, as we had been most solemnly warned at Arolla, that in a chimney some distance up the Aiguille a large loose rock would be found, which, if merely touched by the first man, would fall down and utterly annihilate both him and his unfortunate comrades below, and that, furthermore, the top of the peak itself, apparently built upon this rock, would roll down, bit by bit, until nothing but a little stump would remain, and thus Arolla would for ever be deprived of its Aiguille. As a matter of fact, when we began climbing the rocks, we became so engrossed with our work that we quite forgot the loose rock, and never found it or thought of it until we had reached the top. Here we enjoyed to our heart's content in golden sunshine one of the most enchanting views imaginable.

As anyone can easily believe who has seen Mr. Larden's most useful 'Guide d'Arolla,' it was a great privilege for those of us who contemplated making a prolonged stay at Arolla to have him with us, as, without doubt, he knows infinitely more about the climbing there than any other person; and I, for one, did not spare him with questions as to routes and new work to be done. Amongst the latter, he recommended the Dents des Bouquetins and one of the Aiguilles Rouges.

After this day I had many other good views of the Aiguilles Rouges from different peaks, and at last began to realise, what I had at first disbelieved, that there must be some truth in the statement of the local guides, that 'the best climbing about Arolla was upon the Aiguilles Rouges.'

On Friday, September 2, my wife and I decided to abandon a scheme that we had formed of going to Zinal on the Saturday, as the weather was bad, but, as the Arolla guides hold the theory that 'if it rain to-day it will be fine

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to-morrow, and *vice versâ*,' Messrs. Harold W. Topham and Arthur Macnamara had arranged with Jean Maître to attack one of the unclimbed Aiguilles Rouges the next day, and were good enough to ask me to join them, which, fortunately for me, I consented to do, though with little hope of success. We all agreed, however, that if the weather did allow us to set off, Jean Maître was merely to act as the sub-alpine guide and alpine porter.

In the small hours of morning, rain was still falling, and the porter, who had developed from a churl into a right good fellow, did not awaken us until the rain had fled away. At 6.15 we set off in broad daylight. As we were all in good training we agreed to walk quickly. Having passed the Praz Gras chalets, we followed the bank of an irrigation stream, and soon reached the Glacier des Ignes. This is a poor wizened little glacier, which is sadly overladen with débris from a great variety of rocks. In fact, its lower end is nearly snuffed out. The upper portion, however, is clean, and we found it bare ice.

At 8.15 we breakfasted on a large glacier table, and as the clouds had just drifted away from the southern aiguille, the one we wished to climb, we carefully studied our route.

The Aiguilles Rouges consist of three peaks, of which the central or highest had alone at that time been climbed. The northern peak is merely a large spur on its loftier neighbour, but yet, when seen from the north, it looks very fine. The southern peak rises directly out of the Glacier des Ignes with very high and perpendicular precipices, from the tops of which steep and massive buttresses spring, and support a most jagged mountain crest singularly well suited for the light clouds to play at hide-and-seek. The face is unequally bisected by a gully, which, plainly enough, would lead to the arête some distance south of the highest point. This made us decide to vary the usual custom of climbing Arolla mountains—'from the other side'—and to attack it boldly in front.

At 8.45 we set off, and in ten minutes reached the rocks, and were soon in the gully, where we had an interesting climb, but only once met with any great difficulty, which was in recovering an axe which had fallen over a boss of rock. At 10.15 we reached a col on the southern arête, and had a most savage view down the other side. After 35 minutes' halt we roped for the first time, and had a rare good scramble over several points on the arête, and reached a top at 11.15, and *the* top at 11.32. From here we had one of the grandest

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views of the Matterhorn conceivable. The top of the mountain alone was visible in a frame of ever-changing clouds, and it seemed to be infinitely higher than any mountain I had ever seen in my life. It just chanced also that the top was seen directly over the point of the Aiguille de la Za. The other Zermatt mountains were mostly cloud-hidden, which increased the grandeur of the Matterhorn. Whilst on the top a large white-tailed eagle sailed most majestically out of some mysterious rocky eyrie a little below us, and, without so much as even deigning to look at the intruders on its solitude, with a few sweeps of its wings vanished amongst the crags. A few croaking ravens then came and flew about us.

So far we had had lots of good climbing, but nothing quite first-rate; but, as we had resolved to descend our new peak by its northern arête, if possible, and then to climb the central aiguille, we felt sure that we had a really good time before us, as both the arête and the central peak looked most grand from where we were.

As I cannot sufficiently thank my companions for allowing me to act as leading guide, I will not attempt to do so. They did so, however, and I took the coveted place of last man on the rope. Starting again at 12, difficulties at once began. Not a yard could be climbed on the terrible west face, and not much could be done on the arête, which is very narrow, and broken up into scores of little minarets. We were soon forced on to the east face, and began scrambling round its buttresses, and across its gullies, and then back on to the arête, and felt, like a foxhunter when a good fox has broken cover, with a wide grass country before him, that we were in for a good thing. After a time we neared the last and biggest pinnacle, which we thought, when we saw it from the top, might prove to be too much for us. We had already passed other points by going up and down, round, over, and under, as the case required, but this pinnacle was much stiffer than anything we had yet met with, and it looked bad enough. We climbed carefully down a buttress, traversed the face under the pinnacle, and then got on some smooth rock slabs, and found ourselves looking down into and across a very steep gully, the trough and sides of which were polished like an ancient spinster's tea-pot. At first we reconnoitred two or three places, but to no use; then, by sheer good luck, we noticed above us, between a large boss of rock and the high wall of the pinnacle itself, a little gap, which might possibly prove to be the top of a chimney

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leading into the gully. We were soon up to it, and, to our joy, found a vertical chimney, about eighteen feet high and eighteen inches wide, at the bottom of which there was an irregular three-inch shelf, which formed the actual top of the gully under the pinnacle. I anchored myself firmly, and the others went down and took the axes. The chimney is a charming place to be met with before dinner, and both it and the ledge afforded us a most enjoyable wriggle and scramble. Soon afterwards we reached at 1.35 the col between the two peaks, having had 1 hr. 35 min. stiff climbing down from our new peak. Here, too, we got into old ground, as the central peak had once been ascended by a gully up to this col and then by the S. arête. As this arête appeared to be very easy, after what we had gone through, Topham, who goes like a greyhound at Altcar, proposed that we should 'hurry up.' We did so, and in 25 minutes we reached the top, and left a long arête behind us. On the way up we found a beautiful tuft of *Silene acaulis*, whose long tap roots pierce with little difficulty the soft green schistose rock of this arête. The *Ranunculus glacialis* is almost as much at home here as on the Jotun Mountains in Norway.

Our new peak looked very grand from here, and we felt as proud as Punch for having climbed it. The view into the two valleys of Arolla and Hérémence was a singularly sterile one, and the only little speck of real fertility visible was around the hamlet of La Sage, an oasis surrounded by dull burnt-up brown land. The south faces of all the peaks around us were snow-free, whilst the northern and western seemed to be terribly cold and snowy.

We set off again at 2.20, and descended by the north arête and east face. This route is as pretty and varied a rock climb as can be wished for, and it is a great pity that it is so very little known. We reached the col between the north and central Aiguilles at 3.30, the top of the Glacier des Aiguilles Rouges at 4.30; we unroped beyond the glacier at 4.50, halted until 5.20, and reached Arolla at 6.30 P.M.

As the mountains were in perfect order, and as we went very quickly all day, our times must not be considered quite average. All our difficulties were met with when descending. We had altogether an enormous amount of rock-climbing; in fact, I have very rarely had so much on any one expedition. We did not meet with the slightest trouble or danger from the falling stones which the native guides seem particularly to associate with the Aiguilles Rouges. As leading guide, I must say that my duties were reduced to a minimum by the

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ability of my English comrades and of Jean Maître, who is a good rock-climber, and who may be safely trusted as leader on these and other mountains at Arolla.

Few mountains in Switzerland afford so good rock-climbing as the Arolla peaks, the Dents des Bouquetins, Mont Collon, the Aiguilles Rouges, and others, and yet comparatively few climbers have taken the advice of Mr. Cust and others to make Arolla their headquarters for a short time, instead of Zermatt and Grindelwald. Many peaks have only once or twice been ascended, and there is still new work to be done by those who thirst for glory. These should study most closely Mr. Larden's 'Guide d'Arolla' when published. For my part, I think Arolla is a delightful place at which to spend a month's holiday. The big and little expeditions to be made are equally good. Interesting glaciers are near at hand, the nearest of which—the Glacier de Cijorénove—is now advancing most rapidly, and by next summer will most probably have covered an ancient green lateral moraine, and so will destroy what was, last year, very decent pasturage. There are pretty walks through the meadows and the woods of the Arolla pines to neighbouring chalets, and suitable fields for exercise for both the young and old.

Exploration of the Caucasus in 1888.

I.

[The following note is extracted from the Journal of the R. G. S. for September last. We may mention here that in the current November number of the same Journal will be found an article by Mr. D. W. Freshfield on 'The Peaks, Passes, and Glaciers of the Caucasus,' summarising the results of exploration up to date.]

'MR. A. F. MUMMERY returned from the Caucasus early in August last, after a successful and very pleasant journey. Starting about the end of June with an Alpine guide, Zurfluh of Meiringen, he went straight to the central group, of which Koshtantau, 17,096 feet, the second (measured) peak in the Caucasus, is the highest (measured) summit. The qualification is necessary until the height of Shkara (see Mr. Freshfield's recent map and paper) has been ascertained. The difference in height between the two peaks is not very great, perhaps 250 feet, but it appears likely that Shkara will, as Mr. Freshfield has anticipated, prove to be the higher. On July 24, Koshtantau was ascended; two previous attempts, on one of which Mr. Mummery climbed alone the south-western buttress of the great mountain, itself 13,500 feet high, having

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been unsuccessful. In the course of Mr. Mummery's journey the lofty ridge connecting Dychtau and Koshtantau with the watershed, and dividing the névés of the Bezingi and Dychsu glaciers, was twice crossed by passes respectively about 13,000 (Shkara Pass) and 13,700 feet. An attempt to ascend Shkara from the Dychsu glacier had to be abandoned in consequence of glacier difficulties which were too great and continuous for so small a party. The main chain was also crossed into Suanetia by a variation of the Zanner Pass (described by Mr. Freshfield), and a return to the valley of Chegem on the north side of the chain effected by a double pass over the Thuber, Gvalda, and Basilsu glaciers, west of the natives' Basil Pass and never before traversed, which throws much new light on the intricate topography of the névés of these great icestreams, and the structure of this part of the chain. The upper névé of the Gvalda glacier proves to extend to a point considerably east of a line drawn due north from the snout of the Thuber glacier. The weather was fine throughout, and the snow, except on steep slopes, in excellent condition. The revision of the Russian survey is to proceed very rapidly. A single officer has been instructed to survey the square represented in the map published with the May "Proceedings" during this summer, and the new map is intended to be published by the spring of 1889. Mr. Mummery writes as follows with regard to travel, and his experiences are the more valuable, in so far as he went without previous experience of the country or special facilities:—"No other holiday has afforded me half the pleasure. I found the travelling much easier than I expected. Notwithstanding that my interpreter proved too short-winded for the high passes, I managed to get all I wanted, from chickens, duck's eggs, new potatoes, and Russian bread in Suanetia, to mutton, oatcakes, and fresh milk in Balkar and Chegem. I became great friends with the old chief at Bezingi, who gave me several dinners in his private apartments. I in return provided tea and sugar for himself and his numerous relatives and friends. One of the Bezingi hunters accompanied me over the glacier passes, but not on the ascents. But some of the Bezingi men are splendid walkers, equal on rocks to average Alpine guides; on ice, of course, they have much to learn, and their foot-gear is ill-suited for continuous mountaineering. The diurnal variations in the weather are also perhaps worth notice. Bright mornings, wind and a little cloud about mid-day, with mist and a suspicion of rain or snow at sunset were the characteristics of the weather while I was there. The mist and showers did

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not extend below 8,000 feet, but the dews were quite sufficient to account for the vegetation on the moraines."'

II.

On August 10 a party, consisting of Mr. J. G. Cockin, Mr. H. W. Holder, and Mr. Hermann Woolley, with the Grindelwald guides, Ulrich Almer and Christian Roth, started from Rostov, on the Don, with the view of exploring the mountains at the head of the Bezingi Glacier. They arrived at Kotlarevska on the afternoon of the next day, and proceeding with all possible despatch reached Naltshik on the evening of the 11th, and Bezingi at noon on the 14th of August.

On the afternoon of the 15th they pitched their tent on the east side of the Bezingi Glacier, about 8,400 feet above the level of the sea, near a shelter called 'Missés Kosh' by the natives.

An Attempt on Koshtan Tau.

The day after their arrival they started for Koshtan Tau. Having slept out on rocks a little above the lowest ice-fall of the Koshtan Glacier, they made an early start, following the line of ascent taken by Messrs. Dent and Donkin in 1886. They reached the 'ochry-red' rocks, and then were compelled by gendarmes to make a detour to the south face of the south western arête. After being baffled in two or three attempts upon the white rocks they were enabled, by keeping close to a couloir, to reach a height of about 16,000 feet. By this time, however, the day was so far advanced that they were compelled to abandon their expedition and return to their tent.

The Ascent of Koshtan Tau.

Three days later another attempt was made upon the same mountain, this time by the northern arête.

The night of August 19 was spent on a ledge of rocks on the right bank of the 'Missés' Glacier (the middle one of the three glaciers marked in Mr. Freshfield's latest map). In the morning the party started at 4.45. They reached the depression in the N. arête overlooking the Mishirgi Basin at 8 o'clock. The summit was gained at 2.5 p.m. The snow varied much in character, but was for the most part light and powdery, making progress difficult. The steep rocks which had to be surmounted afforded good climbing, but the rocks of the arête, though loose and gene-

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rally covered with light snow, were not difficult. Very little time was spent upon the top, as a strong cold wind was blowing and clouds were gathering. The depression in the N. arête was reached on the return at 6 p.m., and the sleeping-place at 10.45, considerable delay having occurred through the necessity for taking to steep, difficult and unknown rocks to avoid the ice-fall, as the method by which this had been turned in the morning was impracticable at night. A second night was spent on the rocky ledge, and the tent was reached the next morning.

The Ascent of the 'Saddle Peak.' *

The party left their camp at 2.25 a.m. on August 24, proposing to attempt the ascent by the N.E. face. After leaving the Bezingi Glacier the course lay up good firm rocks alternating with short snow-slopes. Then a ridge of shattered rock was followed as long as possible, after which the ascent was continued up the steep glacier which is prominent on this face of the mountain. The plateau from which the final peak of the mountain rises was reached at 1 p.m., and the summit at 2.25.

The climb from the plateau to the arête, and along the arête to the summit, was difficult and tedious, the snow being in very bad condition, and the rocks generally covered with snow.

Mr. Cockin was prevented by indisposition from completing this ascent.

After this ascent Mr. Woolley took no part in the expeditions of the party, his arm being disabled through the influence of frost and snow on a slight wound in the wrist.

For some days the weather was unsettled, and no climbs were attempted.

The 'Shkara' Col.

On the 29th Mr. Cockin and Mr. Holder started at 4.30 a.m. for the pass at the base of Shkara marked with a (?) in Mr. Freshfield's map. The top of the col was reached at 9.45. The party only descended a short distance on the east side of the col, as it was perfectly evident that there

* The Saddle Peak is situated about midway between Gestola and Djanga. Mr. Freshfield puts it upon his map due S. of Gestola, and almost due E. from Tetnuld. This is not quite correct. See Mr. Donkin's photograph (facing *A. J.* xiii. 252), in which the Saddle Peak is the middle of the three peaks, and is immediately under the letters S.W.

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were no difficulties in the descent on this side upon the Dych Su Glacier. The remainder of the day was spent in reconnoitring on the arête to the N.E. of the col, but the mists prevented any trustworthy observations being taken.

An Attempt on Mishirgi Tau.

On the evening of August 30 the party slept out on the rocks where the night had been spent in the first attempt on Koshtan Tau. A start was made the next morning at 5. The glacier was in good condition, but the highest ice-fall gave serious trouble. At 8.45 the schrund was crossed and the foot of the S. arête was reached. From this point a traverse was made to a couloir on the S.W. face of the mountain. The ascent was continued by this couloir and over rocks for some hours. Then the arête was struck again, and finally, at 2.25 p.m., the party found themselves at a height of about 16,000 feet, cut off from the highest peak by a deep cleft. They returned, crossed the schrund at 7 p.m., were benighted on the mountain, and arrived at the tent the next day at 9.30 a.m.

The Ascent of 'Salananchera.' *

The party started from the tent at 5.5 a.m. on September 3. They followed first Mr. Freshfield's route for the Zanner Pass, then by loose rocks climbed to the head of the col on the W. arête, which was reached at 10 a.m. The summit was gained, by the western arête, at 11.30 a.m. The rocks on this arête were good, but the snow, as usual, in a very unsatisfactory condition.

The top of Salananchera is a splendid point for topographical observations. An hour was spent on the summit, and the tent was reached at 5.10 p.m., a thick fog causing great delay in crossing the glacier near 'home.'

On September 4 Mr. Holder and Mr. Woolley left the camp for Bezingi, and returned to England by Vladikavkaz, the Dariel Pass, Tiflis, and Batoum, Mr. Cockin remaining with the guides to try further ascents.

On October 10 Mr. Holder received a telegram from Mr. Cockin announcing his safe arrival at Batoum, and inti-

* This is the unnamed peak, in Mr. Freshfield's map, lying to the N.E. of the Zanner Pass. There seems little doubt that Salananchera is the name given to the glacier descending from this mountain towards the Bezingi Glacier, but whether or not it is the local name for the mountain itself is uncertain.

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mating 'did Shkara, second peak of Djanga, top of Salananchera Pass, Zanner Pass, and north peak of Uschba.'

[On November 5 we received, through the kindness of Mr. Holder, Mr. Cockin's detailed notes of his splendid ascents. The late date at which they have been received, and lack of space, compel us to hold them over till our next number, but the following summary gives an outline of the narrative. On September 7 Mr. Cockin, with Ulrich Almer and Christian Roth, made the first ascent of Shkara. They started from the Bezingi glacier, and having gained the northern arête of the peak, followed it (in parts very sharp, much step-cutting required) for 4½ hours to the summit. An observation made on the top showed that Shkara is higher than Guluku. On September 12 the same party made the first ascent of that point of Djanga which is nearest Shkara. This ascent was also made from the Bezingi glacier, by means of a lateral glacier, some rocks, and long snow-slopes. 'We had a clear view, and found ourselves well above the Saddle Peak and still more Gestola, well below Shkara, and a little below another point of Djanga. Our point is the one nearest Shkara; the point farther away, and appearing in the photo-print to be lower, is higher.' The line taken on the ascent of both peaks can be well seen on the photo-print given with Mr. Donkin's paper.* On September 28, Mr. Cockin alone with Ulrich Almer (Roth being temporarily crippled with rheumatism) made the first ascent of the north peak of Ushba, this being their third attempt. This was achieved by way of the great couloir between the two peaks, in which the snow was found to be very soft (there had been a great fall of fresh snow a few days before), though in a safe condition. They reached the 'neck' between the two peaks in 10 hours (including halts) from their bivouac just above the last trees on the south side of the peak, and thence in 2.35 more, mainly by not difficult rocks, gained the summit of the northern peak, an overhanging corniche of snow. They remained on the top about forty minutes, but were in mist all the time, and could not ascertain whether the northern peak was the higher or lower of the two summits.† With less snow and ice on it than on Sept. 28, the ridge from the 'neck' to the south peak would probably be possible.—EDITOR.]

* *Alpine Journal*, vol. xiii. p. 242, 'Panorama from below Guluku.' Shkara is there named Koschtan Tau.

† Both Mr. Freshfield (*A. J.*, vol. xiii. p. 508) and Messrs. Donkin and Fox (*infra* p. 97) have expressed their opinion that the northern peak is most probably the higher.

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Notes of an Expedition to the Caucasus.

(With Remarks on the Recent Accident.)

By CLINTON DENT, President.

ON August 1 last our party, consisting of W. F. Donkin, Harry Fox and myself with the guides Kaspar Streich and Johann Fischer, reached Batoum. During the journey out we settled finally the programme we hoped to follow. From the very first we had agreed that the expedition was to be mainly exploratory, and that no undue time should be wasted in attempting big peaks if the weather were unpropitious. We hoped to ascend and traverse the highest point of the Leila chain, starting from Lentechi, in the Skenes Skali Valley. Reaching thus Betsho, we meant to try Ushba, ascertain its relation to the main chain of the Caucasus and the water-parting, and elucidate the topography of the glacier country immediately around the peak.

The ascent of Dongussorun (14,600 R.S.) was one on which we were much bent. The topography of this part of the chain seemed but little known and the point of view could hardly fail to give most valuable information. The mountain, which resembles a huge Breithorn, was not likely to be difficult, and the camera and surveying instruments would easily be carried to the top. It was this part of the exploration which was expected to yield the most solid geographical results; results which may still be forthcoming, but which will have acquired the saddest interest, and will have been obtained at a sacrifice that cannot adequately be reckoned.

From the head of the Baksan Valley (in which Urusbieh is situated) we hoped to make our way by the head waters of the Tchegem and Urban rivers to the Bezingi district, and thus establish something like a 'high-level' pass between the Baksan and Tcherek Valleys. At Bezingi our principal hope was to lay down more accurately the minute topography of Dychtau. No part of our plan was more discussed than this. Even if the ascent should prove impracticable or unwise, we hoped to make a high tour of the peak, such as might be compared to that of Monte Rosa by the Sesia Joch, Col delle Loccie, and Weiss Thor. We were, I think, more anxious to achieve this portion of our programme than any other. It was almost certain that Donkin would find a splendid field for photography and the photographs would be likely to have much geographical value. Fox fully realised that to the surveyor who was a moun-

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taineer also the district had very special attractions; while I was keen to visit a district of which we saw so little in 1886. Koshtantau, Djanga, Salananchera, and the peaks on the main chain could be surveyed from the north or south side, but Dychtau was much less likely to attract attention. To this part of our programme we turned so repeatedly that I have no hesitation in saying that we all considered it to be our main objective. Moreover, we had little hope of finding Koshtantau (our Guluku of 1886) a virgin peak by the time we reached Bezingi, or of being the first to traverse the Shkara Pass (from Karaoul by the Dychsu glacier to the upper snowfields of the Bezingi glacier). For some reason or another, too, we spoke and thought less of the actual ascent of Dychtau than of making a high tour of the peak. The possibility of ascending or traversing Malatau was also frequently discussed, for the peak could hardly fail to give a fine view of Dychtau. We took out the following instruments and apparatus :—Large camera and small 'revolver' camera, theodolite, pocket sextant, small 'Abney' clinometer, prismatic compass (used especially for the 'orientation' of photographs taken), aneroids, boiling water apparatus for determining heights, telescope, small compasses, &c.

August 2.—Reached Kutais at 1.30 P.M. Met Rieger, our interpreter (who, I may at once say, worked admirably), and rode on same evening to Djoneti, a 'duchan' 12 versts from Kutais.

August 4.—Reached Lentechi. Road from Kutais is practicable for carriages as far as Alpan, a post-station some 50 miles from Kutais. Regretted we did not drive as far up as possible. A Government order for horses and carriage desirable to save expense and delay.

August 5.—Rieger to go on with luggage *viâ* Latpar Pass, to meet us at Latal. We started for Mount Leila with two native porters whose services were obtained in the usual way. The request for native aid is at first scouted as one not to be entertained. After an hour or two volunteers come in freely enough.

August 5–8.—We walked deliberately into the trap against which we had been warned and, following the wrong spur of the Leila, failed to make the peak, and thus crossed the chain some way east of it. It was on this expedition that I broke down utterly. The delay must have been more than vexatious to my companions for the fine weather was slipping away and we were making no progress. Yet never for an instant did Donkin's thoughtful consideration and sympathy relax;

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never for a moment did Fox's cheery brightness falter, nor did he allow the disappointment he must have felt to make itself manifest. Poor guides would have lost heart, but our men kept up the spirits of the party and vied with the native porters in attentiveness. The debt of gratitude should be paid, though there are none to receive it. Owing to the wise foresight of Streich, we did not run short of provisions. We had no tent, but fortunately the weather was uniformly fine. Our pass, which we estimated at 10,650 feet, lay considerably to the west of Mount Latpari (R.S.). This should not be confounded with the well-known Latpar Pass, which lies some 15 miles further east. Magnificent view of the Ushba during descent. This peak lies almost due north of our pass (357° by the prismatic compass).

August 8.—Met Rieger at Latal. Went on at once to Betsho. Priestav was ill, but we were hospitably received by his secretary. Some Urusbieh men, who had just crossed from the north side, came in, and offered to act as porters if we desired to cross to the north side at once.

August 9.—Fox started early with guides to reconnoitre Ushba, while Donkin and I followed later on with tents and baggage, accompanied by Dr. Sagel, of Kutais, who wished to see something of the glacier world. Camp formed by Gulba glacier, close to moraine, at a height of 9,650 feet. Rieger was left at Betsho in charge of the baggage. Some peaks south-west of Mount Leila, separated by a tributary of the Ingur, seem from the camp quite as high as that mountain. One point has a curving snow arête, like that of the Grivola. Heat intense. Tent made of Willesden canvas and with bamboo poles answers admirably.

August 11.—Donkin, Fox, and the guides started at 3 A.M. for northern peak of Ushba. Weather moderate, a hot wind blowing all day. Rain had fallen during night of August 9, and there was a little fresh snow. Party returned at 4 P.M. Snow was in bad order, and avalanches frequent, also falling rocks. Very high wind. All think ascent would be feasible under suitable conditions of weather. All favour the main couloir as best line to follow. Estimated height reached, 14,200 to 14,600 feet. This was probably erroneous, being too high. Rain in night.

August 12.—Natives brought up bread and cheesecakes for sale, and a regular post was kept up between camp and Betsho.

August 13.—Same party started for southern peak at 2 A.M. Weather uncertain. But it does not answer in this country

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to predict evil of the weather and act accordingly. Push on always and do all you can, should be the rule, fearing not to turn back if the elements combine against you. Party made for 'Burgener's route,' but were invisible to me after 9 A.M. owing to clouds. Rain in camp. Snow on peak. Party returned about 6 P.M. They were forced by the state of the snow to leave the couloir, and were actually stopped by some vertical rocks. All were of opinion that the couloir offered the best line of attack for the southern, as for the northern, peak, and that on a suitable day the ascent might be simple enough, though never probably quite free from some risk. Comparisons of boiling-point observations taken on highest point reached with aneroid readings led to the conclusion that highest point of Ushba (the northern peak) would turn out to be 15,600 to 15,800 feet. Donkin and Fox both reported most favourably of the guides, who worked admirably, notwithstanding that it was evident almost from the first that success was out of the question.

August 14.—Weather still unsettled; so, in accordance with previous determination, it was decided, though reluctantly, to abandon Ushba and cross the chain. My strength would not return, and it was evident that the whole expedition might result in failure if I attempted to keep any longer with the party. My own journey is of no interest, and I need only mention here that, accompanied by a single attendant—a Svan, addicted like too many of the natives to strong drink—I rode from Betsho to Alpan, over the Latpar Pass, and subsequently drove down to Kutais, without any difficulty worth mentioning. Travel is a simple enough matter now, even through the wildest part of a country to which formerly the title of 'Savage Svanetia' was not unjustly given.

August 16.—Donkin, Fox, and the guides started for Dongussorun, intending to join Rieger who was in charge of the baggage and train of native porters either at some point on the Betsho Pass, or in the Baksan Valley. Rieger's orders were to make his way on to Urusbieh, and there to wait. And so we parted. It seemed impossible at the time that anything could add to the bitter disappointment of leaving my companions, but what was but a wrench then is a regret now that will be life-long.

What happened subsequently must be briefly summarised. The mountaineers succeeded in ascending Dongussorun. They had fine weather and succeeded in taking observations

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from the summit. They also crossed 'a new and splendid pass' between the Adyr-su and Tchegem valleys, described by the Urusbieh people as 'used only by the mountain-goats and not by them unless forced.' The above information is derived principally from Baron Ungern-Sternberg, who met the party at Urusbieh. From the Tchegem valley they went on to Bezingi. A note dated Bezingi, August 24, which Mr. H. W. Holder received from Donkin, furnishes the next item of evidence. The parties, though close to each other, did not actually meet. On August 25 Donkin's party left Bezingi for the Doumala glen. Rieger was sent round to Balkar. In his note to Mr. Holder, Donkin stated that they 'proposed to have a look at the Dychsu glacier,' and remarked that if they crossed to the Bezingi side they might have an opportunity of meeting Mr. Holder's party.

The next certain information we have is that on August 28 the party were in the Doumala glen, on the north side of Dychtau. This is known from Fox's letter to the interpreter, of which part of the text is given below. We know now that the mountaineers proposed to make the ascent of Dychtau, possibly descending towards the Dychsu glacier. In addition, or as an alternative, I think it likely that they wished to make a high tour of the peak. In conversation with Mons. N. Djukoff, a Russian officer engaged in the survey of the district, Donkin led him to believe that the ascent of Dychtau was the last item on the programme, but their actual intentions would, of course, have been determined by the weather. Then follows a great and fearful blank.

On September 26 the anxiety we had been feeling for ten days or more was brought to a climax. News came to the effect that the interpreter, telegraphing from Naltchik, had heard nothing of Donkin and Fox for twenty-seven days. The gravity of this intelligence was at once evident to those who knew the country. Instantly a request was sent to Mr. D. R. Peacock, English Vice-Consul at Batoum, begging him to instruct the interpreter to return to the mountains and organise search from Bezingi, Balkar, and Gebi, offering reward for any positive information. Through the courtesy of the Russian Embassy in London, Prince Dondukoff Korsakoff, Governor-General of the Caucasus, was instantly communicated with and requested to do all in his power to further the search, and application to the Foreign Office met with the most prompt and generous response. By the greatest good fortune Mr. Clive Phillipps-Wolley happened to be at Bezingi at the time, and with

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a generous feeling worthy of an Englishman at once undertook the work of organising and leading the search, receiving the most material aid from Mons. N. Djukoff. It was no easy matter either to collect natives who could be of any use on the glaciers or to make them understand what was wanted. Still, thanks to the prompt and vigorous action of the Russian authorities and the energy of Mons. N. Djukoff, Mr. Phillipps-Wolley, Mr. Peacock, and Mr. Donald (acting Vice-Consul at Batoum), the search was soon instituted and strenuously prosecuted. From the very first there seemed little hope of any success and the information that reached England tended only to confirm the most gloomy forebodings. On October 5 a brief paragraph appeared in the 'Times,' quoted from a provincial newspaper, and the certainty now that the worst had happened seemed so absolute that the 'Times' kindly published on October 6 the following letter:—

Sir,—The wording of the paragraph relating to a reported mountaineering accident in the Caucasus, quoted in your issue of to-day, impels me reluctantly to request the insertion of these few lines. Unhappily, there exists no longer any doubt that Messrs. W. F. Donkin and Harry Fox, with the Swiss guides, Kaspar Streich and Johann Fischer, have all lost their lives by a mountaineering accident. The disaster probably occurred about September 1 last, either on the mountain now known as Shkara or, less probably, on one of the neighbouring peaks. A thorough search, furthered, as we learn through various sources, by all the local and other authorities, is in active progress. An English traveller, who happens to be in the country, and who has an intimate acquaintance with the country, the natives, and the language, is assisting in the search. While I am writing, a telegram from him comes to hand informing me that "traces have been discovered on —— glacier." The name of the glacier I am unfortunately unable to decipher.

I am, Sir, your obedient servant,

CLINTON DENT, President Alpine Club.

Alpine Club, Oct. 5.

The glacier referred to is now known as the Ullu-auz glacier, and descends from the northern flanks of Dychtau towards the Doumala glen.

It should here be mentioned that from the first the question of organising a search party from England and taking Swiss guides was most anxiously discussed. Several members of the Club were ready to start at an instant's notice, and preparations were made. Offers of assistance came also, I am pleased to mention, from Meiringen. The late period of the season would have rendered it almost impossible to do more than receive personally such information

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as might have been collected. No search in the higher regions would have been practicable for any mountaineers by the time a party could have reached Bezingi. The idea was not finally abandoned until letters and telegrams from Mr. Phillipps-Wolley informed us that he was at the head of the search parties. The work could not have been in better hands. With reference to this subject the following 'inspired' paragraph from the 'Times' of October 8 may be reproduced:—

Information has been received to the effect that heavy snowfalls have already occurred in the mountain regions of the Caucasus. The higher glaciers are usually inaccessible after the middle of September. There is but very slight hope, therefore, that the search parties instituted by the executive of the Alpine Club, and now actively at work, will obtain any more definite information this year as to the exact fate of the missing mountaineers. If such prove to be the case, we understand the Alpine Club will organise a search party early next spring. Many offers of personal assistance have already been made.

Further information threw some additional light on the disaster and enabled us to condense all that had been ascertained with tolerable certainty up to date (October 13) in the following letter, which appeared in the 'Times' of October 15:—

THE FATAL MOUNTAINEERING ACCIDENT IN THE CAUCASUS.

Sir,—Letters and telegrams which have been received from Mr. Phillipps-Wolley from Naltchik and Bezingi make it possible to add some fresh facts and corrections to the intelligence that has been published with regard to the recent disaster in the Caucasus.

Mr. W. F. Donkin and Mr. H. Fox, with their Alpine guides, left Bezingi on August 25. On the 28th Mr. Fox wrote from Doumala, a side-glen of the Bezingi Valley, some four hours' walk in length, to the interpreter in charge of the heavy baggage a note, a copy of which Mr. Wolley encloses. It is written in German, and is to the following effect:—

'We have been across the mountains to (or towards) Karaoul. We start early to-morrow, and hope to be at Karaoul on the 30th or 31st, where you must meet us. If bad weather should come on, or the descent on the other side prove impracticable, we may have to return to Bezingi and ride round. But, anyhow, wait for us at Karaoul. We send back our tent and some things we shall not need on the mountain. Pay the bearer for five days.'

The evidence of this native, who was probably in the travellers' service (either as messenger or camp attendant) from the 25th of August, and who may have seen them start on the morning of the 29th of August, has not yet been received by us.

From this note and knowledge of the locality we draw the following conclusions:—The mountaineers must have crossed—perhaps twice—

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a glacier pass at the eastern base of Dychtau which, so far as can be judged from photographs and drawings of both sides, is not difficult or dangerous. They must have planned, probably from what they saw on this pass, some other expedition by which Karaoul could be reached in two or three days, and from which, if repulsed, they would naturally descend to Bezingi. There are, it would seem, only two possible expeditions which fulfil both conditions. Either they intended to traverse the peak, called in maps Dychtau (16,900 feet), but by the people of the country Koshtantau, or to make the tour of its western flanks by traversing in the first instance a high pass to the Mishirgi glacier. Between these possibilities no one can as yet decide.

It is further clear from Mr. Fox's note that the party carried with them all they had, and that there is no prospect of any records being recovered at their last camp. The traces or tracks found by the search party on a glacier we now know to be that at the head of the Doumala glen may equally well have been left on the 27th or 28th as on the 29th or 30th of August. It seems certain that the accident, of whatever nature it may have been, happened at a great height in a region where at this late season no search could be prosecuted with reasonable hope of success. Had it been otherwise there would have been no lack of volunteers ready to start from this country. But we have every reason to hope that all that is at present possible has been done by Mr. Phillipps-Wolley, acting in conjunction with the Russian officials and with the fullest powers from home to offer rewards or to take any other steps in his judgment likely to lead to the obtainment of precise information as to the catastrophe.

Mr. Fox's letter leads us now to conclude that the accident cannot have happened on Shkara (about 17,300 feet), as we at first supposed. Moreover, that peak has since been climbed by an Englishman with Alpine guides without any traces of predecessors having been found. In the district where our friends disappeared travellers run no risk whatever of detention or robbery, and this supposition must be entirely dismissed. The storm that has been referred to did not occur until eight days after the party left Doumala, and they could not have carried with them provisions for so long an absence. The weather in the last days of August and first days of September was, as we know from Englishmen who were in the same district, favourable for mountaineering. The idea that the climbers committed any imprudence in not taking 'local guides' can only be entertained by persons little acquainted either with the Caucasus or with mountaineering. There are no guides among the natives of the Caucasus capable of taking part in difficult glacier explorations, and it is for this reason that the snowy range has remained so long unexplored.

It is, of course, deeply to be regretted that the interpreter should have so long delayed giving any information of his employers' disappearance. But there is no ground for supposing that his silence was due to anything worse than an error of judgment or that it can have had the slightest influence on a disaster which was in all probability instantaneous.

It may perhaps be a satisfaction to some of the travellers' friends to learn that no pains have been spared to secure the safe transmission of

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any records, observations, or photographs that may have remained among their luggage.

Anyone who desires to know more of the local topography will find a map of the district either in the June number of the 'Proceedings of the Royal Geographical Society' or in the August number of the 'Alpine Journal.' There is a woodcut of the glacier of the Doumala Valley in the latter journal. Some idea of the topography may be given to your readers by saying that, if Bezingi is put in the place of Zermatt, Karaoul will correspond roughly with Mattmark and Dychtau with the Dom. All the places referred to are north of the main chain of the Caucasus.

We are, Sir, your obedient servants,

CLINTON DENT.

DOUGLAS W. FRESHFIELD.

Alpine Club, Oct. 13.

Since the above was written the evidence of the native, Beslau Betaieff by name, has been received through Mr. Phillipps-Wolley. All his statements appear to be thoroughly trustworthy. He reports that on August 25 Donkin, Fox, and the two guides started from Bezingi with a baggage horse. They camped in the Doumala glen about 12 versts from Bezingi. On August 26 the party proceeded up the glacier in the direction of Dychtau. The party remained in the mountains during August 26 and 27, and returned to camp about 10 A.M. on August 28. August 28 and 29 were spent in camp. On the evening of the 29th Betaieff noticed that the party were preparing provisions for apparently a long expedition. On August 30 (*not* August 29), at 3 A.M., the party started off by lantern-light in the same direction as before. Betaieff was instructed to take the letter and the baggage back to Rieger, who was waiting at Balkar. He set off as soon as it was light, and in due course met Rieger, who paid and discharged him.

The camp was formed on the true left bank of the Ullu-auz glacier close to its termination and, whatever the expedition contemplated, it was necessary to proceed up the left bank towards Dychtau. (See illustration in No. 101 of the 'Alpine Journal,' facing page 10.) The Doumala and Ullu-auz glaciers are identical, the latter being the name now adopted by the Russian survey. The party very possibly ascended Dychtau or Malatau on August 27. They returned in high spirits on August 28, and had evidently made a successful expedition. The existence of a cairn on either of the peaks would determine this point. It is not unlikely that the first sentence of Fox's letter, 'Wir sind über die Bergen nach Karaoul gegangen,' was anticipatory. He

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would not have informed Rieger of any expedition made. If this supposition be correct it would modify the views expressed in the fifth paragraph of the letter in the 'Times' of October 15 to some extent, for the travellers might have met with an accident on one or other side of the glacier pass over the eastern flank of Dychtau.

There is no occasion now to enter into all the details of the search. Yet many will be interested to learn of the scale on which it was carried out. Mr. Phillipps-Wolley was first in the field, with Mons. N. Djukoff and a party of seven natives. Another party of nineteen natives, headed by a Russian official, started about Sept. 29 and went over the same ground. But the heavy fall of snow that had taken place rendered it impossible for them to gain any further information than Mr. Phillipps-Wolley had already acquired. The wording of the published translation of the report of the second party made it appear that they had ascended the actual summit of Dychtau in the pursuance of the search. This, of course, was an impossibility.* Tracks of nailed boots were found on the moraine situated on the left side of the icefall of the Ullu-auz glacier, and close to the upper level of the icefall. The tracks were made in ascending, and consisted of a single line of footsteps. The moraine is steep, and it is almost needless to point out that all would have trodden in the same places. Mr. Phillipps-Wolley crossed in deep snow over to the right side of the glacier above the icefall, but without gaining additional information. The icefall is well shown in the woodcut already referred to. In addition, another search party started from Balkar and explored the Dychsu glacier, while on the south side of the chain an expedition was organised from Gebi. To the energy of M. Veeruboff, Governor of Naltchik, the speedy organisation of the search parties was largely due. The thanks of the Committee, acting on behalf of the Alpine Club, have already been tendered to all who were directly and indirectly concerned in the search. But it will not be out of place here to express with less formality, though with no less sincerity, the grateful recognition of all the efforts made to learn the fate of our friends. To those who have travelled in Russia and the Caucasus the action taken was

* Readers may be reminded once more that the natives do not attach the same signification to the name of a mountain that we do. They would naturally describe, for instance, an expedition up to any part of the mass or range of Dychtau as an 'ascent' of Dychtau.

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no matter of surprise. To others it may be pleasant reading. It is not merely the official aid, however generously given, that we should acknowledge. There is something beyond this, deeper even than a friendly interest. For we are conscious of that touch of sympathy which is as potent as the touch of nature to make the whole world kin.

It should be added that on October 15 a telegram from Mr. Peacock announced that further searches were impossible, owing to heavy snowfalls in the mountains. With this telegram the last vestige of hope and the last trace of doubt, if any existed, were done away with.

As to the precise nature of the accident it is perhaps idle to speculate. No clear evidence on the point can be hoped for before next year; none, perhaps, will be obtained then. Yet one or two considerations may be offered. It is certain that the accident happened high up. The entire party were lost, assuredly at a moment when they were roped together. They might, therefore, have been overtaken by bad weather. This possibility is disposed of at once by the reports we have of the weather at the time. The first serious storm after August 28 occurred on September 5. Again, one of the party might have slipped on an ice-slope and dragged all the others down. To those who knew the mountaineering skill of the party, one and all, the supposition appears hardly credible. Thirdly, one or more may have broken through a snow bridge, and all may have been lost in a crevasse. Possible, but most unlikely, for a more careful party never went on the mountains, and the guides were excellent at snow work and were known for their thoroughness and caution. A fall of stones or the toppling over of a sérac does not sweep away an entire party on a long rope.

There remains but the danger arising from some form of avalanche, either the sliding away of a huge layer of snow loosely adherent to an ice-slope beneath or the fall of an ice-cliff or heavy cornice. Mr. Phillipps-Wolley saw the blue ice-blocks of a recent avalanche which had fallen across the natural route to the pass to Karaoul, but there is no evidence as to the date at which it fell. Such risks are undoubtedly greater in the Caucasus than the Alps, and constitute a source of danger against which the very best mountaineer cannot wholly guard, any more than the very best navigator can prevent his ship from striking on an unmarked reef. To some such cause I believe is due the disaster which has occasioned a widespread sorrow almost unparalleled in the history of mountaineering.

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The Growth and Sculpture of the Alps.

By Prof. T. G. BONNEY, D.Sc., F.R.S.

(The Tyndall Lectures for 1888, delivered at the Royal Institution, London.)

No. 2.

The Alps, it is evident at a glance, are a more complicated chain than the Pyrenees or the Caucasus. Not only do they consist of more than one well-marked parallel range, but also the chain is not in its ground plan a simple elongated ellipse: it is not one single linear wave uprising from the plain: but it is a long and peculiarly formed loop. True, the main chain runs for a considerable direction W.S.W. in a tolerably straight line, which at length curves gradually towards the south; but then, as I said, the Alps cannot be separated from the Apennines, on the one side of the Adriatic, or from the Julian and Dinaric Alps, the mountains of Dalmatia and Bosnia on the other. They are thus, as a mountain system, in intimate relation with the plain of Northern Italy and the hollow of the Adriatic Sea. The relation resembles that of the great Asiatic ranges to the deserts of Thibet. Conceive the process of upheaval continued, and the Alpine peaks elevated to the stature of their Oriental brethren: then the Adriatic would become an enclosed inland basin, probably occupied in part by a salt lake. The relationship of the Alpine chain is evidently much closer to the Adriatic than to the Mediterranean. With the latter it does not appear to have any very immediate connection, while of the former it seems to be in a certain sense the consequence, as though the existence of that hollow in a region undergoing contraction had caused a puckering of the marginal zone.

A geological map shows us that on the east the Alps commence as a central range of crystalline rocks bounded north and south by parallel ranges of sedimentary. These rise slowly from the great Danubian plain, and gradually attain an elevation which is often from 10,000 to 11,000 feet, but rarely exceeds 12,000 feet. The chain now broadens, the northern margin continuing very uniform, but the southern trending southward, and following at a distance the contour of the upper end of the Adriatic. East of Verona this southern margin bends rather north of west, and the chain again diminishes in width. In the broader part the structure is at first more complicated than it was further east; but presently it becomes more simple, giving two well-marked ranges, of which the southern forms the watershed, with two others to the north, less clearly indicated, the outermost resulting from the amplification of a fringe of hills which, though it exists further east, is humble and hardly noticeable. But as the watershed passes from the central to the southernmost range, so almost simultaneously the belt of secondary rocks of which the latter is composed in the eastern district narrows till ultimately it seems to disappear beneath the gravels of the Lombard plain. Henceforth, until we approach the Maritime Alps, the plain of Piedmont is girdled by a mountain-wall

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of schist and other crystalline rocks. The structure of the Maritime and Cottian Alps is similar to, but rather more complicated than, that of the central region; its details, however, I pass over for the present.

We next observe that the folds of rock, from which the mountains have been sculptured, do not maintain a uniform elevation—that is, one of the Alpine ranges is not a wave of which the crest rises from either hand to a single maximum, but one in which the crest alternately rises and falls. For instance, on the east and west side of the Oberland *massif*, the crystalline rock is not found higher than some 5,000 or 6,000 feet above the sea, while in the central part it attains an elevation of more than 14,000 feet. Again, at each end of the Mont Blanc *massif*, we find Secondary rocks 6,000 or 7,000 feet above the sea, while in its peaks and aiguilles the crystalline core has been thrust up to a height of from 13,000 to more than 15,000 feet.

From this it would appear that in certain places either the lateral thrust was more intense, or the crust of the earth, from some cause or other, yielded more readily to it. This might well occur at the parts where the pre-Triassic land-masses most interrupted the continuity of the earlier Secondary deposits; that is, over the site of the islands in the Triassic sea. While I would not affirm this to be the only explanation, it is a fact that, so far as we can ascertain, the lower members of the Secondary series are wanting in the districts where at present the crystalline rocks attain the greatest height above the sea.

We observe in the third place, on considering the general disposition of the rocks constituting the Alpine chain, that, in addition to the long curving folds which determine the general direction of the component ranges, they give indications of a cross folding. The axes of these minor undulations run from about NN.E. to SS.W. The most marked among them, reckoning from the east, is the synclinal trough, associated with the valley of the Adige and the Lake of Garda. This, though less conspicuous north of the line joining Meran and Bozen, seems to be traceable as far as Innsbruck, and to be indicated by the outlier of Secondary rock on either side of the Brenner railway, north of Sterzing. The *massif* of the Orteler Spitz and the district to its north seem indicative of another and less clearly marked parallel trough; the rather abrupt cessation of the region of Secondary rock, on the south side, near that end of the Lago Maggicre, and the remarkable bend of the watershed of the Pennine chain, on the east side of the Vispthal also suggest the effect of an anticlinal running in the same direction; while, yet further west to beyond Mont Blanc, the general trend, both of the ridges of crystalline rock and of the troughs of Secondary, suggests similar disturbances. Obviously the whole course of the chain for a long distance south of Mont Blanc corresponds with the same line of folding, but this might be an accidental coincidence. It can, however, hardly be an accident that the central *massif* of Dauphiné, with the parallel crystalline ranges of the Grandes Rousses and of the Belledonne project so markedly in a SS.W., direction, though the watershed of the Alpine chain is already beginning to curve towards the eastward side of a circle of longitude.

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The question then arises, How are we to explain this peculiar cross-folding? (1) Are the Alps the consequence of a series of independent movements, not simultaneous, so that the chain results from the accretion laterally of an independent series of wave-like uplifts; (2) or was the chain defined in its general outline by a series of thrusts proceeding outwards from the basin of the North Italian plain, and afterwards folded transversely by a new set of thrusts acting at right angles to a NN.E. line; (3) or are the latter disturbances the older, and had the floor on which the Secondary deposits were laid down already been disposed in parallel folds, trending roughly in the above direction? Imagine a piece of some flexible material, painted in stripes, running from NN.E. to SS.W., and then forced up in a series of curving wrinkles like the Alpine ranges. These stripes would still preserve their general direction athwart the ranges, and, if they were composed of materials of different hardness, would modify the outline of the later folds.

I confess that the first explanation does not commend itself to me, though the Alpine chain certainly bears the marks of accretion. This, however, has augmented its breadth rather than its length. As a chain, it appears to possess what I may call a unity of design, to have resulted from a series of movements which produced a common effect over a very wide area. The next explanation is more probable, but it is noteworthy that the outer margin of the chain appears practically unaffected by these secondary foldings, instead of encroaching upon the lowland region for an anticlinal and retreating for a synclinal. Moreover, there is nothing else to suggest that at so late a period in the history of the chain this region of Europe was affected by a series of thrusts in a direction from W.N.W to E.S.E. They have no relation to the bed of the Gulf of Lyons, or of the Adriatic, or of any neighbouring lowland district. Thus the third explanation seems to me the most probable. These folds may be due to earth movements which are pre-Triassic, but not improbably post-Carboniferous, in age. Certainly the deep sea, which, as already pointed out, covered the greater part of the Eastern Alps in Triassic times, appears to have shallowed rapidly westwards, and its coast in that direction to have had a general trend much nearer N. and S. than E. and W. The directions of the ridges of older rock in the Schwarzwald and Vosges agree with this, as does the position and direction of the most important watershed in the Cévennes—namely, that from which the Allier and the main stream of the Loire descend—which also appears to be in intimate relation with the whole series of earth movements which have affected Dauphiné.

Still, though I incline to this view, the question is so complicated that I do not feel justified in expressing a strong opinion, and rather throw out the idea for consideration than press it for acceptance. All that I will say is that I find it impossible to explain the existing structure of the Alps by a single connected series of earth movements, and think that the post-Eocene and post-Miocene movements were due to forces acting in the same general directions—forces bearing a symmetrical relation to the depression beneath the Italian plain and the Adriatic Sea.

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In regard to this question it may be well to call your attention to the influence exerted elsewhere by these very ancient land masses on the intervening and more modern deposits. Though the upper beds in the latter frequently overlap, they fail to mask the way in which the edges of the lower have been upturned by reason that, as the whole area contracted, the hard projecting bosses of ancient rock refused to yield and thus the softer intervening rocks were compelled to bend into a basin shape. As an illustration notice the outcrops of the Secondary strata in Northern and South-Western France. Nay, the broad anticlinal saddles between the ancient rocks of La Vendée and Auvergne on the one hand, and between those of the Bourbonnais and the Vosges on the other, are probably due to a concealed isthmus of crystalline rock.

Thus we may venture to explain the absence of any marked folds along the south-west flank of the Bayerischer and Böhmer Wald (the outcrop of Secondary rock by which the Jura chain is prolonged in an E.N.E. direction north of the Danube, turning sharply to the north near Regensburg) by the supposition that the crystalline rocks, which obviously force the Danube away from an E.N.E. to an E.S.E. course, shelve gently downwards beneath the Bavarian plain so as to give a firm foundation to the newer strata. It is probable that the very gap between the Alps and the Carpathians through which this river escapes is due to the existence of a buried mass of crystalline rock, which indeed is exposed near Pressburg, and is, no doubt, immediately connected with that which has determined the plain of Hungary. In short, I think it probable that not unfrequently a plain is indicative of the existence, at no great distance beneath it, of a strong foundation of crystalline rock, and is thus significant of a concealed ancient upland, while a mountain chain records the position of an old sea bed, upon which the deposits of a contemporaneous continent have accumulated to an enormous thickness. Consider two districts, each in outline like a broad ribbon and lying side by side; suppose that in one there came after only 1,000 feet of sediment a solid foundation, of unknown thickness, of crystalline rock, but that beneath the other district there was 15,000 feet of sediment before the crystalline rock was reached. Suppose these two districts compressed transversely. The former would yield but little, though it might be pushed somewhat upwards, while the latter would pucker and fold, and even its solid foundation, being somewhat softened by internal heat, would crush or bend along with it. Thus, in regions of earth disturbance mountain ranges are monuments of pre-existent ocean depths while the lowlands commemorate the ancient upland districts.

I pass on now to see what we can learn from a more detailed study of the physiography of the Alps. As I have already said, there is a very marked change east of the frontier of Switzerland and Austria, or to speak more precisely east of the upper valley of the Inn. This renders it convenient to study the Eastern Alps apart from the remainder of the chain. Broadly speaking, their structure, though not free from some very puzzling minor complications, which will be noticed in the next lecture, is comparatively simple. The chain con-

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sists of three parallel ranges, running from the west very slightly north of east. At their western end some structural modifications are produced by the transverse folding already mentioned, as well as by the buried volcanic masses of the Bozen district; but, as these effects disappear, the structure, for a considerable distance, continues very fairly regular; at any rate these lines of east and west folding dominate over all others. The central range consists almost wholly of crystalline rocks, the northern and southern of Secondary strata of great thickness, ranging from the Trias to the Cretaceous, for in this part of the chain Tertiary deposits are generally relegated to the marginal zones.

The central range broadens out as the whole chain dies away towards the plain of Hungary; thus indicating, as I suppose, a shallowing of the Mesozoic sea towards an ancient land. This range forms the watershed of the chain, and the highest peaks, often about 11,000 feet above the sea, are situated on or near the watershed, the Gross Glockner (12,455 feet) lying slightly to the south of it, but the Gross Venediger (12,053 feet) practically on it. But, as we might expect, the principal valleys which drain the district do not run generally from north to south, or *vice versâ*, but from west to east.

At the present stage of geological knowledge I may venture to assume that valleys are the work of rain and rivers, though the structures of the rock masses modify their forms and their directions. They may conveniently be divided into valleys of strike—namely, those which run parallel with the strike (and so, broadly speaking, with the outcrop) of the rocks; and valleys of dip—those which descend in the direction of dip. The latter obviously will be comparatively narrow and rapid in their fall; the former wide and gentle in descent. Of a valley of strike the course of the Inn from Landeck to below Jenbach is an excellent example. The river flows roughly from west to east for full 80 miles, bounded on the south by the central range of crystalline rock, on the north by the overlying limestones and shales of the Secondary series. It receives the drainage of many considerable lateral valleys from the former, of sundry glens from the latter. The junction of two great rock groups, differing so markedly in their powers of resistance, has obviously determined the initial course of the river valley, which broadens as the stream descends from a height of 2,750 feet to about 1,700 feet. At last, a little east of the entrance of the drainage of the Zillerthal, where the strip of Silurian rock intervening between the Crystalline and Secondary series is beginning to broaden out (can it be because of this?) the river valley begins to bend towards the north. For a while it cuts obliquely across the outcropping edges of the Secondary beds, then from Kufstein (1,550 feet) completes its journey to the Bavarian plain as a true dip-valley. Similar instances may be found in the Alpine courses of the Rhine, Rhone, Arve, Arc, Isère, and many others; indeed, the principle is soon seen to be of general application—namely, that every river, as a rule, follows either a valley of strike or a valley of dip, and in some cases changes several times from the one to the other, as it escapes from barrier after barrier on its way to the plain.

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Obviously, in speculating on the causes which have determined the initial course of a river, we must consider only the broad features of the stratigraphical succession, for these represent more nearly the conditions which existed when the valley systems were first outlined. We must also bear in mind that, as the water obviously must always descend by gravitation, the upper part of a valley corresponds with ground which was once higher than the rest of the course or any barrier which it has severed; and that when once a stream has cut for itself a valley of any size, its course more probably would be modified rather than completely changed by later earth movements. It is even harder for rivers than for human beings to get out of a groove.

Applying these principles to the Eastern Alps, we conclude that the present central and highest range represents the part which was raised to the highest level by the first great uplift. On the northern side of this the Salza and the Enns imitate in their courses that of the Inn, which has been already described; on the southern side the Drave, joined by the Gail, maintains a general easterly course till it emerges on the lowlands. The Mur, an important tributary to the Drave, flows at first parallel with the Kleine Tauern (a prolongation of the central Höhe Tauern *massif*), and then, by crossing a parallel lower range, escapes towards the lowland. I conclude, then, that after the first uplift the northern range of the Eastern Alps was sufficiently determined to produce these great valleys of strike, but that it here and there permitted an escape for the water; that the Carnic Alps on the south were not only determined, but also offered an impassable barrier, which prevented the Drave from escaping towards the Adriatic; while the Mur, in its upper course, exhibits a remarkable relation to a fold in the Crystalline series, and its southern course seems to have been determined by an infold of Palæozoic rock, which apparently was not submerged till the Gosau beds (Upper Cretaceous) were deposited. Indeed, the general directions of the river courses of the Eastern Alps suggest that the folds by which they are determined did not quite correspond with the present outcrop of the rocks, as shown on a geological map, but ran more nearly E.N.E.-W.S.W., the latter striking almost E.-W. This divergence may be due to differences of thickness in the non-crystalline series; for the crystalline rocks occupy a larger area at the surface than we should expect in this less elevated easternmost region; and here also, as stated above, whole groups of strata are missing, which are thickly developed rather further west, as if in this region another old land area had long remained above water.

In the Western Tyrol the valleys of the Etsch and the Eisack receive the drainage of a large part of the southern slope of the central range, and their united stream escapes towards the Adriatic by cutting deep into the 'porphyry' rocks above Bozen, and through the sedimentary series below, till it emerges on the Venetian plain between Peschiera and Verona. Here it is interesting to notice that the curious trough of Secondary rock, to which I have already called attention, converts for a time a valley which, when regarded very broadly, is one of dip, into a valley of strike; for the Adige or Etsch, from Bozen

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southwards, runs with considerable regularity parallel with the general strike of the sedimentary series.

But with the valley of the Upper Inn a marked change takes place in the hydrographic system of the Alps. That river rises in the southern range and cuts through the central one, which up to this time, as has been said, has formed the watershed. This is a change in the position of the watershed of Europe. It presents, indeed, certain minor peculiarities which I must reserve for my last lecture, but obviously it indicates, in accordance with the principles which I have laid down, a marked alteration in the primary orographical features (as I may call them) of the region. Henceforth, for a long distance, the southern range continues to be the watershed. The Rhine, the Reuss, and the Rhone conduct northwards the drainage of a fold or trough, which can be traced all along the northern face of the Rhætic and Pennine Alps from the peaks around the Bernina to Mont Blanc. The crystalline *massif* of the former group seems connected in some way with this important modification, coincident with which is the formation of a plexus of mountains between the valleys of the Rhine and Inn, and the marked elevation of the Miocene strata to the south-east of the Lake of Constance. These, along the margin of the Austro-Bavarian plain, are quite subordinate features in the sub-Alpine scenery, but between the Rhine and the Rhone they not only form the greater part of the so-called Swiss lowland, which often to us in England would seem a hilly country, but are elevated in places to about 6,000 feet above the sea. Very nearly connected with this is a marked widening of the region over which crystalline rocks are exposed, and a narrowing of that occupied by the sedimentaries to the south. These facts combine in suggesting that we are approaching a region where the elevatory forces have acted with greater intensity, and have produced more complicated results. It must, however, be remembered that, notwithstanding this apparent shifting of the watershed to the southern range, the valleys south of it, those of the Adda, Ticino, Tresa, and Dora Baltea are quite comparable with the upper parts of the Etsch and the Eisack. It looks, in short, as if the zone of sedimentary rocks, which in the Eastern Alps forms the southern range, had suffered more from denudation in this central region, and its remnants had been entombed beneath the plain of Piedmont. That secondary rocks once extended over a far greater area on the southern slopes of the Alps is indicated by small outliers which can be traced from the south of the Val Anzasca to beyond the lower part of the Dora Baltea valley.

But as we continue our examination we shall find other reasons for considering that the region for a long distance west of the Inn has been the scene of accumulated and very important disturbances. For a moment we will turn aside to complete the consideration of the river courses. The Rhine, Reuss, and Rhone, as has been said, drain the northern face of the southern range. Hence, like the Inn, they cut completely through the central range; but it is noteworthy that the crystalline region traversed by these rivers, though including the higher part of the Oberland *massif*, as well as the slopes of the Pennines and Lepontines, is barely wider than the mountain district which lies

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to the north of the central range in Tyrol and feeds or is intersected by the Inn—a fact which suggests the comparatively late development of the ranges in the region north of the Pennines. This at any rate is clear—that when the Rhine, Reuss, and Rhone first began to take a northerly course, the *massif* on that side which runs parallel with the watershed of the Pennine and Lepontine Alps must have been so far subordinated to the latter range as to allow the rivers to escape. It would seem, then, probable that the development of the central range, as one of hardly less importance than that of the watershed, must be ascribed to the effect of disturbances, after that the rivers had settled their courses and had become powerful agents of denudation, competent to deal with the uprising rocks which threatened to arrest their streams. Thus, if we would obtain an idea of the first stage in the development of the central region of the Alps, we must turn back to the eastern part of the chain. Here we have a central crystalline axis and a northern and southern range of sedimentary rock, beneath which the crystalline foundation is sometimes exposed. In neither of these two ranges are the sedimentary beds very conspicuously contorted (at least compared with what we see in the other region). This district, then, may represent the central part of the Alpine chain as it was in the Miocene period. Then the Pennine range, as we now call it, was the watershed, representing the Tauern range of the Eastern Alps. To the south, extending probably over a great part of the Italian lakes on to the south side of the Graian Alps, may have been a range of sedimentary rocks, like that south of the Pusterthal, of which now only a few scattered patches have been spared to indicate the extent of Miocene and post-Miocene denudation. It is not impossible that the Val d'Aosta and the Val Tellina may owe their courses to precisely the same influences which have determined those of the Etsch and the Eisack, but that in their case the overlying masses of sedimentary rock have been all but stripped away from the fundamental masses of schist and other crystalline rocks.

On the northern side of the Pennines a broad belt of sedimentary rock beyond the trough now occupied by the Upper Rhone and Upper Rhine would form a northern range, analogous with that which looks down on the Austro-Bavarian plain, and is severed by the Inn and the Salza. Of this the range of the Western Oberland and those east of the Tödi and Glärnisch, which have been less affected by the later disturbances, may serve to give us a slight idea. On this side, also, denudation progressed apace; the sands of the molasse, the vast pebble-beds of the nagelflue, are the work of rain and rivers in Miocene times. These are for the most part of fresh-water origin, but marine beds occur at more than one horizon. For my present purpose it is needless to enter minutely into the subdivisions of the Swiss Miocene. Enough to say that the earliest beds are marine, and from their fossils cannot differ much in age from the Hempstead beds, which conclude the record in the Isle of Wight. Over these come sandstones and the pebble-beds (nagelflue) so prominent in the cliffs of the Rigi, which last attain a thickness of 2,000 feet or more, and these are followed by sandstones and marls, in the higher part of which some marine beds

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are intercalated. The total thickness of these beds, which were formed after the first upheaval, but before the last, at some places, according to Professor Judd, amounts to 7,000 or 8,000 feet. At any rate the sections in the Rigi and the Speer justify us in assigning to them a total thickness of not less than a mile vertical. The beds evidently were deposited as deltas or alluvial fans, often probably confluent, over a lowland district in the neighbourhood of a shallow sea, and at the foot of a mountain region.

The pebble-beds already mentioned bear, as it seems to me, important testimony as to the history of the early Miocene Alps. The Swiss geologists recognise two types, according to the nature of the deposit, the *nagelflue calcaire*, which generally seems to be on the lower horizon, and the *nagelflue polygénétique*, so called because it contains pebbles of various crystalline rocks, in addition to those of sedimentary. Of the latter the huge masses of the Rigi and Speer are constituted. The former are said by the Swiss geologists to be obviously delta deposits; as to the latter there does not appear to be perfect agreement. They are said to contain in Northern Switzerland pebbles from the Vosges or Schwarzwald, and there seems a disposition to dissociate this nagelflue from the main chain of the Alps. It is, of course, possible that in the northern region some stream which flowed from the hills of Germany may have contributed materials, but I think there can be no doubt of the origin and significance of the deposit as a whole. I will speak of the Rigi, which I have examined with some care. The great majority of the pebbles are grits, mudstones, and limestones. There are some granites or felstones, the derivation of which it is not easy to fix, and a few gneisses and schists, the last being so rare that I only found some half-dozen in searching across the Rigi as far as the foot of the Rossberg. The pebbles are often three or four inches in diameter, sometimes more, occasionally even fifteen inches, and are usually pretty well rounded. The nagelflue, in short, resembles the beds of gravel and sand deposited at the present day by the great Alpine rivers as they emerge from the Alps. It can only have been produced by streams which flowed from an important mountain range. Their average velocity cannot have been less than about three miles an hour. The amount of rounding that the pebbles have undergone suggests a journey as long and influences similar to those by which the materials of the Alpine rivers now emerging on to the lowlands have been affected, leading to the inference that the rivers were not less powerful and important, the Miocene Alps were not less elevated than, or in any way inferior to, those of the present day. The position of the above described mass suggests a connection with a river now represented by the Reuss. The pebbles indicate that this river, instead of flowing as the Reuss now does for the greater part of its course over crystalline rocks, was then engaged in removing the overlying sedimentaries, and had only here and there cut down into the granitoid gneisses and schists. But that this and the other masses of nagelflue can owe their origin to anything but a mountain chain, representative of the present Alps, seems to me incredible. We have in it the memorial of their Miocene rivers; the grave and the monument of their Miocene crags.

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These vast masses of river gravel extend from the Rhone to the Rhine, but have their grandest developments about the openings of the Limmat—once probably an alternative channel of the Rhone—of the Reuss, and of the Aar, which river rises far back in the Oberland *massif*, while only the *nagelflue calcaire*, and this not in great force, appears to indicate a delta of the ancient Rhone. From this I conclude that in Miocene times this last-named river, as might be expected, flowed less rapidly than the others. At the present day the level of the watersheds of the Rhone, Reuss, and Aar is nearly the same; but the course of the first is, roughly speaking, quite two and a half times as long as that of the others, and its fall is only 200 or 300 feet more. If this inequality were maintained, while the one fell 100 feet the other would only fall 40 feet.

The basin of the Po affords us evidence confirmatory of the magnitude of the Miocene Alps, and incidentally of their condition in other respects. In the suburbs of Turin rises a range of hills, one being crowned by the Church of the Superga, the last resting place of the House of Savoy. These hills consist of strata of Miocene age, bent into an anticlinal. They appear to have been formed in a rather shallow sea, and are later in age than the pebbly molasse, north of the Alps, being considered equivalent to the overlying marine beds of that region, and somewhat older than the lacustrine deposits near Zürich. Among these are not only pebble-beds, but large blocks of rock, often four or five, sometimes almost nine yards in longest diameter. The blocks are described as 'serpentine and greenstone;' the pebbles as the same, with porphyry limestone and other rocks. In short, in both cases the materials have been derived from the Alps. Hence at that time the covering of Mesozoic rocks had been stripped from the crystalline rocks on the Italian side of the watershed, but the occurrence of limestone in the pebble-beds makes it probable that the removal was less complete than it is now. But how were the great blocks transported? Floating ice appears to be the only possible agency. Yet there seems no reason to doubt that the climate of Europe in Miocene times was rather warmer and more equable than at the present. If we turn to New Zealand we find that in a latitude corresponding with that of Turin, the midsummer temperature is 57·2, the midwinter 50·7, the mean 54 F. The summits of its Alps are commonly from 10,000 to 12,350 feet, and on the west side of Mount Cook (latitude of Florence) a glacier comes within 700 feet of the sea. The snowline is at about 6,500 feet on the east side, and barely 6,000 on the west. Though the mountains are lower the glaciers are for the area larger than in the Alps of Europe. Why is this? Because the rainfall on the west side is large—sometimes more than 100 in. per annum. The Miocene flora and fauna would hardly require a higher temperature than that of New Zealand, provided the climate were equable and similar in character. But in Miocene times Europe was evidently rather a group of large islands separated by shallow seas than a continent, so that the climate would more nearly resemble that of New Zealand. Hence, with a mountain mass rivalling the New Zealand Alps in height, and surpassing them in extent, it would not be sur-

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prising if occasionally the glaciers on the Italian side (which would be then, as it now is, the more rainy) should reach the sea, though even a subtropical flora clothed the lowlands, and a subtropical fauna tenanted the waters. But without a great mountain region, not unlike the present Alps, the erratics of the Superga, which are certainly Alpine in origin, appear to me wholly inexplicable.

The northward bend of the upper Rhine seems to have been determined by the resistance of the schists of the Prättigau; that of the Rhone by the *massif* of Mont Blanc. The valley of Chamouni, it must be remembered, has a certain physical connection with that of the Rhone from Leuk to Martigny, because the trough of Jurassic rock which determines the latter is prolonged over the Col de Balme to beyond Chamouni. Hence, when the course of the Rhone was first determined, the floor of this trough must have been at a higher level than the rock barrier which once connected the masses around the Dent de Morcles with those near the Dent du Midi. The crystalline rock which supports and enfolds this trough of Jurassic slate seems to rise rather rapidly towards the Col de Balme, while the same rock, where it is now cut by the Rhone between Martigny and Vernayaz, seems to maintain a comparatively low level on either side of the valley, as though there had been at this point in the crest of an original wave a depression which had from the first determined the line by which the Rhone escapes from behind the central range.

The Oberland *massif* demands a little more notice. It is noteworthy that the Rhone between Brieg and Leuk cuts obliquely across its general strike. There is also a curious change in the position of the watershed of the *massif* itself; the Aar rises quite on the southern side in conformity with the habit of the central range further east, but west of this river the watershed runs on the north side, so that until the crystalline rocks disappear the larger valleys descend to the Rhone. In this part, moreover, the results of lateral pressure are most distinctly indicated; the crystalline masses which form the principal peaks of the Northern Oberland, the Jungfrau, Mönch, Schreckhorn, and others, with part of the Wetterhorn, over-riding, as it were, the sedimentaries which are enfolded and doubled up so as to form in a vertical section a succession of gigantic loops. Nowhere in the Alps is there such an exhibition of the tremendous thrusts and squeezes by which this part of the Oberland has been forced up so as almost to rival in height the summits of the Pennines.

Now a glance at a section of the St. Gothard region shows a curious difference between the structure of the Lepontine range and the Oberland (central and eastern). The former consists of a series of simple folds—masses of Triassic or Jurassic rock being obviously nipped between great pieces of older crystallines. The same structure is indicated in the Tessin Alps yet further south, where, as the plain is approached, the overlying sedimentaries are better preserved; only here the axes of the loops point distinctly northward, as though there had been a very marked thrusting from the southern side of the mountain mass. But north of the great trough which bounds the Lepontine

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Alps—itself a region of intense compression, the crystalline rocks being sometimes absolutely crushed into slaty slabs, so completely does a cleavage-foliation dominate over every other structure—the region of the Northern Alps for a breadth of some five and forty miles is one of extraordinary and complicated folding, terminating with the doubling up of the Miocene beds in the Rigi and Speer, and the overturning or overthrust of the Eocene and Cretaceous strata along a zone about 10 miles in length.

It is quite evident that a great part of this disturbance is post-Miocene in age. During that period, I believe, the Lepontine Alps formed an important chain, probably not less elevated than at present, because, even if the crystalline masses of which they are composed now stand at a higher level than formerly, we must put back above them, as I have already said, a great mass of sedimentary rock, probably not less than a mile—perhaps even more—in thickness, which has been since removed by denudation. We should then have in this region a chain like that of the Eastern Alps, with a broad mountain zone on the north, which at that time was only moderately folded and contorted. Then came another great thrust. Perhaps it somewhat accentuated and threw over the southern folds, while it yet more tightly nipped and crushed those in the Lepontine regions. These, however, could not yield much more, and so like one block they transmitted the pressure to the northern zone, which had not yet been strained to its utmost limit, and thus produced the wild confusion which at present exists. This disturbance appears to have reached its maximum in the central part of the Bernese Oberland, where a large ellipsoidal wedge of crystalline rock almost overrides the sedimentaries, and its carious fragments tower aloft in the rugged peaks which guard the basin of the Aletsch glaciers and look down on the green pastures of the two Sheidecks.

It is an interesting fact that the courses of the great Indian rivers exhibit a close correspondence with those of the Central Alps. Like the Rhine and the Rhone, the Indus and the Brahmapootra rise in the lofty upland at the back (*i.e.* on the north of the Himalaya range), and after a long parallel course cut their way to the Indian plain through this mighty mountain wall, while the Sutlej, like the Reuss, rising in the same way, takes a more direct course through the barrier than the main river into which it subsequently flows.

But it is time that we glance at the Western Alps, for hitherto we have practically limited our view by the deep trench of the Rhone between Martigny and the Lake of Geneva. The whole of this mountain region, as far as Dauphiné, exhibits a remarkable uniformity of structure. At the southern end we find the great crystalline ridges of the Belledonne and Grandes Rousses, with their infolds of Secondary rock; we find the huge *massif* culminating in the Meije, Ecrins, and Pelvoux, which seems to have been forced like a gigantic plug through the sedimentaries, bending back their edges, and in some cases elevating them in huge arches a mile vertical in height. East of these comes a trough of Carboniferous rocks which practically can be traced to the valley of the Rhone; and yet further east comes the great series

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of crystalline schists which can be followed without interruption from the Pennine to the Maritime Alps.

This last as a rule forms the present watershed, and it also indicates, as I believe, that of the Miocene Alps. Low as are the passes of the Genèvre (6,102 feet) and the Echelles de Planpinet (5,783 feet) at the head of the Durance, that river finds its way to the Gulf of Lyons. Hence I consider that the Dauphiné ranges, with their prolongation to the north, owe their present elevations, like the Oberland, to post-Miocene disturbances. This at any rate is certain, that the Romanche, which rises high up in the north part of the main crystalline *massif* of Dauphiné, must from the first have been able to traverse the ridges which prolong the line of the Grandes Rousses and the Belledonne, but which it has now gashed so deeply in the Combes de Malaval and de Gavet. The Dauphiné *massif* also has probably forced the Durance to take at first a southern course. The molasse of the department of the Isère indicates, like that of the marginal region in the Oberland, that there have been great disturbances since it was deposited.

In the Mont Blanc range we recognise the prolongation of the Pelvoux axis. In that of the Brevent, the double fold of the Belledonne and Grandes Rousses may still be traced. But here an anomaly presents itself. The watershed at the head of the Val d'Aosta deserts the line of the crystalline schists, and, twisting westwards around the affluents of the Dora Baltea, passes along the crest of Mont Blanc and its aiguilles. The structure of the region, indicated by a geological map, would lead us to look for it not far from a line joining the Vélan with Mont Pourri or the Grand Apparei (more accurately Granta Parey). (It may be noted that the highest peaks of the Graians seem to stand in a certain relation with their loftier rivals in the greater *massif* from Monte Rosa to Mont Colon.) If we believe, as I am disposed to do, that the Mont Blanc *massif* owes its present supreme eminence to a post-Miocene upthrust —*i.e.* is contemporaneous with the Oberland *massif*—we are tempted to speculate whether, in this one case, the exceptional elevation attained by this upstart mass may not have interfered with the old watershed, and have added to the basin of the Dora Baltea the drainage of the southern flank of the Mont Blanc range and of the trough of Jurassic rock between it and Morgex.

It remains only to say a very few words about the relation of the Alps to the Jura and the Apennines. It is, I believe, generally admitted that the folding of the former was in the main post-Miocene, although there are signs of earlier disturbances. Thus the singular course of the Rhone as it escapes from the Swiss lowlands towards France was probably determined by the puckering up of the Jura, a prolongation of which no doubt considerably modified the lower courses of the Isère and Romanche. The Apennines I regard as closely related to the Alps and to the Adriatic basin. Though they have been more than once subsequently disturbed, I think it probable that they were to a great extent contemporaneous with the first Tertiary upheaval of the Alpine chain, and in looking for a cause of the singular curvature of the Maritime Alps and North-western Apennines round the valley of the Po, we must not forget the islands of Sardinia and Corsica,

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or the submarine plateau from which they rise. The axis of the latter plication seems to be continued on to the Carrara Mountains, where the crystalline series is again thrust up, and we find a region of very marked disturbance.*

But enough for the present. Many details of interest must be left for the third and last lecture; to-day I have only attempted to trace in broad outline the development and sculpture of the Alps. I will merely say in conclusion that, though I have been forced to speak, for the sake of clearness, of the *dates* of great disturbances, I do not consider these to have been in any way sudden. The uplifting of any part of the Alps was probably a slow process, occupying thousands of years, only there appear to have been periods, however long, of steady upheaval, perhaps with some corresponding depression in the area immediately beyond, followed by periods, not of absolute, but of comparative, repose.

On Some Effects of Lightning on Crystalline Rocks.

By J. ECCLES.

(Read before the Alpine Club, June 5, 1888.)

Although the occurrence of vitrified lightning tubes in sand on the coast of Cumberland, in North Germany, and elsewhere, is widely known, it is singular that the action of lightning on solid rock, in spite of its much more frequent manifestations, should have received so little attention.

When Bourrit, in 1784, made his first attempt to ascend Mont Blanc, two of his guides detached themselves from the party and passed beyond the summit of the Aiguille du Goûter. On their return they handed to him some specimens of rock partly covered with blackish glassy bubbles or drops. These were submitted to De Saussure, who, after much hesitation, concluded that the bubbles were due to rapid fusion by lightning. But he was not satisfied with mere speculation. He subjected a piece of crystalline rock to repeated discharges of an electric battery, and found that similar bubbles were produced. This is the first recorded observation of what is now called 'fulgurite' on solid rock.

These vitreous bubbles or beads are a pure natural glass caused by fusion of certain constituents of the rock. As a rule, the effects of fusion are superficial, and the rock appears as if it had been splashed with larger or smaller (more often smaller) drops of a pitchy-coloured or greyish-white liquid.

The specimens exhibited (No. 1) were obtained by me in 1870 from some lumps of rock which just appear through the snow near the summit of the Dôme du Goûter—probably the same locality where De

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* This statement is not made in haste or in ignorance of the recent assertions of certain geologists, whom I believe to have fallen into a very common error.

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Saussure's specimens were obtained. I found here small pieces of stone, which had been detached, actually cemented together by the fused glass.

The colour of the glass varies according to the nature of the stone. The darker varieties, which are the more easily detected, owe their blackish or dark-green colour to the presence of mica or hornblende, whereas the lighter kinds are mostly felspathic. Although the lighter-coloured fulgurites are less frequently observed, this, as is remarked by Professor Albert Heim, is not due to their less frequent occurrence.*

Sometimes both light and dark varieties are found on the same rock specimen, in which case the surfaces respectively occupied by each variety correspond almost precisely with the alternations of mineral constituents.

I have found these fulgurites on many of the peaks of the Pennine Alps, and the chain of Mont Blanc, and on several of the Oberland peaks. Professor Heim, in the paper previously referred to,† incorporated certain observations by Herr S. Simon on the occurrence of fulgurites in the Bernese Oberland and Bernina groups, and the last-mentioned gentleman, who has made a much more minute search than previous observers, states that there is scarcely a peak of crystalline rock in the Oberland group which does not show examples of them. A very interesting fact is recorded by Professor Heim. In 1868 he found many specimens on the summit of the Pizzo Centrale, composed of hornblende-schist, none however being found at a greater distance than three mètres below the summit. He collected all the specimens and took them away, but on revisiting the peak in 1875 he found a fresh supply. All these again he carried away. In the interval between these visits, however, a stone man had been erected by the St. Gothard engineers, and an iron post placed therein, which appears to have stopped the formation of the fulgurites, as subsequent visits were entirely unproductive.

Before leaving this branch of the subject, I will quote from a paper contributed to the 'Quarterly Journal of the Geological Society,' May, 1885, by Mr. Frank Rutley, F.G.S., Lecturer on Mineralogy in the Royal School of Mines, on some specimens which I had submitted to him.

On Fulgurite from Mont Blanc; with a Note on the Bouteillenstein, or Pseudo-chrysolite of Moldauthein, in Bohemia. By Frank Rutley, Esq., F.G.S.

An interesting paper by Mr. J. S. Diller, of the United States Geological Survey, upon fulgurite from Mt. Thielson in Oregon, appeared in the 'American Journal of Science,' vol. xxviii. Oct. 1884, in which allusion was made to the effect of lightning upon hornblende-schiste on the summit of Mont Blanc, as noted by De Saussure.

On reading this, I remembered that some years ago Mr. James Eccles gave me two or three small specimens showing evidence of fusion on their sur-

* *Jahrbuch des Schweizer Alpenclub*, 1885-6, vol. xxi. pp. 342-357.

† *Notizen über Wirkungen des Blitzschlages auf Gesteine*, pp. 345-352.

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faces, which he at the time considered to be due to the action of lightning. They were collected by him on the summit of the Dôme du Goûter from small peaks of rock rising out of the snow at a height of 14.000 feet above the sea-level. These peaks form part of the chain of Mont Blanc. The fragments are small and consist of hornblende-gneiss; for they contain some felspar, and one of the specimens is traversed by coarse irregular foliations of felspar. Mr. Cuttell has made several attempts to prepare a section through this specimen with the thin fulgurite film adhering to it, but unfortunately failed, the fulgurite crumbling away in each trial. The cuts made through the specimens at various points show, however, that the fulgurite is quite superficial, no trace of fusion being visible below the original surface when the cut surfaces are examined with a lens. Indeed there appears to be no alteration of the rock from the electric flash, except on the actual surface itself, where a number of globules, sometimes in the form of attached spheres, sometimes in quite irregularly fused pellets and blotches of brownish-black and of white glass, have been formed. The latter is the frothy glass or enamel resulting from the fusion of felspar, while the dark glass is due to the fusion of hornblende. Upon one piece the surface is fretted and blistered over an area of about half a square inch. Some of the globules have minute holes from which gas has escaped; while others have been inflated into thin, spherical, or irregularly blistered bubbles. The dark glass is tough, some pressure being needed in order to detach small pieces from the broken bubbles. Fragments of these bubbles, when examined under the microscope with high powers, appear to be absolutely structureless and to contain nothing but a few small gas-bubbles. In this respect the glass corresponds precisely with the Mt. Thielson fulgurite described by Mr. Diller, for there is no trace of crystallisation-products in either case. On the surface of one of the specimens three or four glass-bubbles, each about the eighth of an inch in diameter, adhere to the rock quite close together, while from them a series of minute globules of glass appear to be scattered in a somewhat radiating manner, some of them being connected with the larger globules by a thin fretted trail on the surface of the rock, indicative of the sputtering of the fused material from the point struck by the lightning. The blow-holes of the glass vesicles from which the gas has escaped show an involution of the vesicle-wall around them, as though each hole had been formed by a wire pressed into the bubble while hot. This involution of the vesicles around the blow-holes is possibly due to fusion, cooling and contraction taking place with extraordinary rapidity. That the cooling of the glass was unusually quick is proved by its freedom from crystallites. Fulgurites, on this account, are probably the purest natural glasses ever formed.

The edge of a thin splinter of the rock taken from this specimen fused with intumescence, before the blow-pipe, to a dark glass similar to that of the fulgurite-globules.

The dark and the white glass globules do not, as a rule, appear to have mixed. They are often distinct, even when in contact, showing a clear line of demarcation between the two different kinds. Some instances may, however, be seen in which the dark shades off into the white glass. The fusion of both the hornblende and the felspar must have been so instantaneous, and the cooling so unusually rapid, that the fused surface of each crystal solidified almost exactly *in situ*, except where a sputtering of the molten matter was caused, either by the force of the electric shock or by sudden disengagement of gas from the fused material; for, in presence of such intense heat, the difference in the respective fusibilities of the hornblende and felspar cannot be taken into account.

But these glassy bubbles and splashes, although the most common, are not the only effects which lightning produces on crystalline rocks.

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Alexander von Humboldt found on the summit of the volcano Toluca, in Mexico, small tubes, about three inches long, which had been pierced by lightning, and the inner surfaces of the tubes had been perfectly vitrified. The rock was a kind of trachyte.*

But the most remarkable find was that of Abich, the Russian naturalist. In a letter to Haidinger, in 1869, given at length in the 'Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften' (Wien, lx. v. 155, 1870), he describes phenomena observed by him on Lesser Ararat, in rock which he calls Hornblend-Audesit, and of this description I give a partial translation:

On pinnacles of lightish-brown rock on the higher declivities are found dark vitrified patches resembling the droppings from pitch torches. Here also the lightning bursts through the rock and makes narrow tubes of the diameter of a small quill, the inner surfaces of which are coated with a dark green glassy scoria or slag. These increase in quantity towards the summit, where their frequency is such as to produce an actual modification of the rock itself, which may appropriately be called a Fulgurit-Audesit. The fulgurites, in the form of worm-shaped channels 'mit geflossenen oft halb getropften Rinden,' burst through the rock in such a manner and are so closely crowded together that the rock itself is changed from a compact stone with micro-crystalline structure into a cavernous incomplete melted product which may be compared in appearance with wood which has been completely destroyed by teredo boring.

Last year I found, on the summit of Monte Viso, lightning-tubes similar in many respects to those found by Abich on Lesser Ararat. There is, however, one rather important difference—viz. the absence of any structural change in the rock by the penetration of the lightning, which may be partly accounted for by the probable greater compactness and hardness of the Monte Viso rock, which much resembles the 'grüne Schiefer,' and partly by the much less frequency of the tubes themselves, of which a prolonged search did not enable me to find more than forty. The formation of these tubes, indeed, seems to produce no more effect on the rock itself than does that of the glassy bubbles before described. A certain proportion are, in my opinion, not true tubes, but rather semi-tubular channellings of the rock by the lightning. I suspect also that in many cases the lightning has taken advantage of some slightly open joint, or has run along the surfaces of a cleavage plane, between which it has inserted itself at some point where the opposing surfaces were slightly open, or just on the point of opening, and while forming a perfect tube has at the very same moment rent asunder the adhering surfaces of the planes and thereby split the tube in two longitudinally.

Of the specimens exhibited, the largest is probably an example of both modes of action—the tubes on the chief surface have once been perfect, and produced by the lightning working between planes, one surface of the plane being split away; whereas the continuation of the tubes round the corners of the stone and on its opposite surface is the

* *Kosmos*, vol. iv., part i., note 531, Sabine's translation.

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effect of external channelling. It appears to me to be more difficult to attribute the origin of the ramifying tubes on the chief surface simply to the action of lightning falling directly on the outside of the stone.

Although I made a very careful search, I could find no more than two tubes in all in which the circumference remained complete at any point, and these were in rock so solid that I could not detach them without destroying them. In both these cases the rock was pierced nearly at right angles to the cleavage.

I am not aware that these tubes have previously been observed on any of the peaks of the European Alpine system, and no record of such observation is to be found.

Isolated from other mountain groups, and towering far above any of the other peaks of the Cottian Alps, Monte Viso occupies a position exceptionally favourable to the display of electric energy, and the existence of the tubes may be due to this energy having been here on a greater scale than elsewhere in the Alps. But so far this supposition rests too much upon purely negative evidence, and before concluding that such tubes as have been found on Lesser Ararat and Monte Viso do not exist in the main chain or other groups of the Alps, a much more careful and systematic search than has hitherto been made is required. It is quite possible that similar phenomena, not at the time expected, or possibly even not looked for, may have escaped observation during a too hasty search, and that a good find of the bubble-like fulgurites may have drawn attention from the more interesting tubes. This may easily have happened on more than one occasion in my own experience.

I commend the search for evidences of lightning action to all fellow-climbers, and suggest the careful examination of the summits of all well-isolated rock-peaks, such as the Matterhorn, Dent Blanche, Finsteraarhorn, &c. The area of search is always circumscribed, and the fulgurites will not be found *in situ* more than a very few feet below the summit or the final ridge, but the *débris* accumulated at the bases of all pinnacles on the summit ridge should be carefully searched.

Sunburn.

By R. L. BOWLES, M.D.

In conversation with an Alpine friend it was suggested to me that some observations I had made during my many holidays among the Alps would be interesting to the readers of the 'Alpine Journal,' and he expressed a hope that I would string them together in the form of a paper.

These observations are more or less of a scientific character, but have no pretension to scientific accuracy. As my wanderings among the Alps have always (except on one occasion when I paid a visit to Davos in winter) taken place in June and July, I have been neces-

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sarily much more amongst the snow than those who visit Switzerland at a later period, and, as the days are long and the sun powerful, the subject of sunburn soon forced itself in a very practical manner upon my attention.

It will, I think, be readily conceded by Alpine climbers that sun on snow burns more quickly than on rocks or in the heated valleys at a lower elevation, although one may feel the heat more in the two latter situations; it is when one reaches the snow that one adopts veils, masks, and snow-glasses. This increased power of burning appears somewhat singular when one reflects that the heat rays must be occupied in the melting of the snow and thus rendered latent.

Glass-workers, iron-workers, and others are constantly exposed to a heat of four or five hundred degrees Fahrenheit, and yet do not become burnt; and there can be little doubt that the enormous radiation from heated rocks and valleys, in addition to the direct rays of the sun, make up an amount of heat far greater than is ever experienced on even a very sunny snow-slope, and yet one does not become sunburnt. How grateful is the change from the hot and oppressive rocky moraine to the refreshing coolness of the glacier! No doubt the surface of the snow reflects and disperses much heat, but certainly far less than it receives; for, as above stated, heat rays are absorbed and rendered latent by the snow melting and evaporation. Experience fully corroborates this, for one may often lie on one's back and freely expose the face for long periods to the sun and yet remain unburnt. There must, therefore, be some other factor in sunburn than heat alone.

In discussing the subject with Dr. Tyndall, he agreed that many artisans are exposed to far greater heat than travellers on a snow-slope, and that the former do not become burnt, and he added the very interesting and significant fact that he was never more burnt on the Alpine snows than he was whilst experimenting with the electric light at the North Foreland lighthouse, where there was no heat sufficient to produce such an effect, and where no snow was present.

So far then all evidence goes to prove that some other active principle must be at work besides heat to irritate the delicate capillary vessels of the skin, and to cause them to fill with blood and exude those products which doctors know to be connected with inflammation, giving rise to redness, swelling, blistering, and subsequent peeling of the skin. I am aware that sometimes, in peculiar conditions of the atmosphere, the direct sun's rays will burn. I have met with some singular instances where several persons have been burnt on the same day, even in England, who had never previously suffered in that way. I am further aware that sometimes (not always) on a ship's deck in a dead calm one may be severely burnt, and that in boating on a river the same may occasionally happen. These experiences do not, however, detract from the induction that there is in snow-burning some cause in addition to heat which is constantly in operation; indeed, they raise the suggestion that the sun's rays are in some way, hitherto unexplained, at times acted upon by atmospheric, electric, or other causes, and brought into a condition similar to those rays which are reflected from snow. It appears that sunlight reflected from freshly fallen snow

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acts much more energetically on the skin than that reflected from older snow.

If my premisses are in the main correct, there are other matters of interest connected with the subject of snow-burning, such as its modifications by colour and complexion, or susceptibility of the nerves of the skin, its effects on the eye in effecting snow-blindness, the dark colour acquired by the châlets in the Upper Alps where they are exposed to the combined influences of sun and snow, and the curiously brown colour of the complexions of those who spend their winters in the Engadine.

In illustration of some of the points raised, I would relate the following observations. A gentleman (Mr. W.) tells me that on July 9, 1886, he crossed the Findelen glacier to ascend the Findelen Rothhorn, and that he had felt no discomfort whatever from the sun until they had arrived nearly at the top of the mountain, when they crossed a patch of fresh snow, and in five minutes he began to feel the stinging, burning sensation of sunburn, and in the evening the usual symptoms were fully developed. On no place besides the snow did he feel the sun, and he was only on the snow for ten minutes. A gentleman and lady (Mr. and Mrs. L.) tell me that they were never more burnt in their lives than when ascending the Pigne d'Arolla, and they had not a ray of sun from the moment they started until their return. They were enveloped in clouds so thick near the snow that the guides had the greatest difficulty in finding their way. They were, moreover, quite cold—so cold, indeed, when standing, that the lady's hands were blue and senseless: both she and her husband had considerable experience in high Alpine regions. The Pigne d'Arolla is a mountain of 12,472 feet high, with very much snow on its surface. Probably the cloud overhead was not very thick, and acted in some way on the sun's rays, so as to develop their irritating properties.

In June 1879, a gentleman of very fair complexion and light eyes, almost an albino, became extremely ill from the effects of sun-burning. He had been up the Titlis on the preceding day; his face was immensely swollen, red and painful, and his arms up to the elbow in the same condition, hard and extremely painful. They felt benumbed, stiff, and useless; he had scarcely slept the preceding night in consequence of the pain and discomfort. The next day the parts were all covered with yellow blisters, and he felt very ill in himself; the only parts not inflamed were those that had been protected by spectacles.

It appeared that he had turned up his shirt sleeves on ascending the snow-slopes. He was seriously ill and in his bed for a week.

On a subsequent occasion, a few years later, I encountered the same gentleman at Bell Alp on the morning after he had made an ascent on the snow; again he was suffering severely from sunburn. The face was much swollen, but I observed that it was pitted in various parts, and that each pit corresponded to a freckle. The following day the face was more swollen and inflamed, and the third day the pittings had all disappeared. It would seem as if the brown pigment of the freckle had prevented the immediate influence of the light rays, but that subsequently the freckles had become involved in the general inflammation.

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Every one knows the beneficial influence of a brown veil and brown glasses to protect the eyes, and I presume that freckles must have a similar protecting influence. I determined to try the effect of colour on my own person. I painted my face brown, and on a brilliant day ascended the Gorner Grat at a time when there was much snow. As it was the first fine day of the season, four different parties had started for the ascent of Monte Rosa; out of one hundred people staying at the Riffel Alp Hôtel, about eighty ascended the Gorner Grat to watch the climbers, I myself amongst the number, with my face, as I have already said, painted brown. In the evening every individual who had been up the Gorner Grat (myself excepted) was smarting under the effects of sunburn. The twenty people who had kept near the hotel and had wandered about the woods during the day, although they had been fully exposed to the sun, were quite unaffected. On the following day I made another excursion on the snow with half my face painted blue, and the other half coloured with burnt cork. Unfortunately I was overtaken by cloud which lasted the whole day, and my skin, perhaps naturally, showed no result. As I had to leave for England the day after, I had no opportunity of prosecuting my experiments further.

The Hon. Ralph Abercromby, in a letter to 'Nature,' April 15, 1886, relates as one of those strange anomalies in which physiological experience contradicts the teachings of pure physics, first, that in Morocco and all along the north of Africa the inhabitants blacken themselves round the eyes to avert ophthalmia from the glare of the hot sand.

In Fiji the natives, who are in the habit of painting their faces with red and white stripes as an ornament, invariably blacken them when they go out fishing on the reef in the full glare of the sun.

Lastly, in the Sikhim Hills the natives blacken themselves round the eyes with charcoal to palliate the glare of a tropical sun on newly fallen snow, and he further tells me that from his experience of a winter in Canada, he was never inconvenienced by the glare, for the simple reason that the air is usually so hazy that the sun is more or less dim.

In relation to snow-blindness, which is certainly associated with sun-burning, I saw some years ago in the 'Lancet' that a German savant had discovered that sunlight rapidly destroyed the visual purple of the retina, and that this effect was much modified when the light was passed through coloured glasses, and that brown glass, more than any other, prevented those changes taking place in the retina.

In my experience sunstroke is not heard of in mountainous regions, and Mr. Ralph Abercromby, who has travelled much, tells me that equatorial regions are not the worst for sunstroke, but sub-tropical and semi-tropical dry countries, such as Scinde, S.W. Bengal, United States, Italy, &c., &c.

It seems that rays reflected from snow have special influence in promoting pigmentary changes in the skin.

I was much struck in my winter visit to Davos by the extreme brownness of the skin of those who remained there; it was as though

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the skin had been coloured by walnut juice. I have several times visited those parts in summer also, but although the sun is much stronger, it by no means produces the same colouring of the skin, excepting on those who make excursions above the snow-line. Residing as I do at Folkestone, I have many opportunities of seeing travellers on their way to and from Davos and St. Moritz for winter residence, and the result is invariably the same. Connected with this subject is the brown colour of the chalets in the Higher Alps. My attention was first drawn to this by Dr. C. J. B. Williams, with whom I was discussing the cause of the brown colour of the skin.

The chalets in the less elevated regions, and which are less exposed to the snow, do not become brown, or only very little so; but as far as I have seen, and my experience is now considerable, they invariably do so amongst the snows. I have investigated this point with some care, and found that the parts of the chalets which are covered by the snow four or five feet from the ground, and the north sides, and those parts so shaded that no rays reflected from the snow could reach them, were of a dirty white colour, as were also the insides and the parts between the timbers.

In a few I found even the north sides brown, but then there was near by a bank sloping at such an angle that the sun's rays must necessarily be reflected from the snow on the north side of the chalet. At Zermatt, Mürren, and Bell Alp are many illustrations of this interesting observation. There is yet another point of interest: invariably over the doorways of the cow chalets the timber is white, even where most exposed to the sun and snow. At first I wondered whether this was due to some chemical change produced by the carbonic acid of the expired air of the animals, but I am disposed to explain the white colour by the presence of the very large amount of water vapour always emanating from the upper part of the doorway, more than to the carbonic acid.

As the direct rays of the sun pass through and have but little heating power on the air itself, the air near the surface of the earth and rocks must be warmed by contact with the same, and then diffused around. On the glacier, on the other hand, the air in contact with the snow or ice can only be at or near thirty-two degrees Fahrenheit, as it gets no warmth from contact. The sloping sides of the glacier depend not only upon the greater amount of dust and dirt on that part of its surface, but also upon the air warmed by contact with the contiguous rocks, which moreover continue to radiate heat for some time after the sun has disappeared from the glacier. Dirt and dust on a glacier, when not too thick, by constantly absorbing and giving off heat to the ice around cause rapid diminution of the ice, and little wells and basins are thus formed. This principle is utilised by the natives for hardening the snow-track or path from the Théodule hut to Breil: dark earth is strewn upon the snow-path, and this by absorbing heat causes rapid melting of the snow beneath, which the nightly frosts render more dense, and thus travellers are saved during the warmth of the day from plunging deeply into the snow. In conclusion, then, I may state generally—

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1st. That heat *quoad* heat is not the cause of sunburn.

2ndly. That there is strong evidence for believing that it is caused by the violet or ultra violet rays of light reflected from snow, which reflected light is not necessarily of the same quality as that which is incident.

3rdly. Captain Abney finds that the violet or ultra violet rays are very strong at high altitudes, and believes that altitude has much to do with sunburn.

4thly. That altitude alone does not explain sunburn, for one may be unburnt on rocks, say, at 10,000 ft., and yet be immediately affected on descending to a glacier 3,000 or 4,000 ft. lower down.

5thly. That sunburn and snow-blindness arise from similar causes, but that sunstroke is not apparently associated with either.

6thly. That rays from the electric light produce much the same results as sun-rays reflected from snow.

7thly. That the bronzing of the skin and the browning of the wooden chalets are probably produced by rays reflected from snow.

The varied experiences just related would probably all be readily explained by a few simple physical laws—*e.g.*, glass is athermanous to the dark or long heat-rays which arrange themselves at the red end of the spectrum; but glass, on the other hand, transmits the light-rays, which are readily decomposed by objects on the farther side of it, and there degraded into long heat-rays, which are now radiated as sentient heat. This is well illustrated in a greenhouse. The light-rays are alone admitted through the glass, and practically *all* the energy in the house is degraded, and then radiated as long heat-rays from the earth and other objects within, which have been agents for the degradation of the 'light energy' into the heat form. After a similar fashion the transparent epithelial layer of the fair skin will transmit the light-rays to the nerves, vessels, and other tissues immediately beneath; the light-rays would there be decomposed, and probably develop dark or long heat-rays, which would be sentient and excite in the very vessels themselves those primary actions which lead to inflammation and its consequences. Black skins, on the other hand, and various pigments, would absorb these light-rays and stop their transmission to those vital parts which may be excited to inflammatory action.

In reference to the singular but well-authenticated fact that, although feeling very cold, one may be more severely burnt on snow *in a mist* than in direct sunlight, we may take it that mist is nearly like glass, athermanous to dark heat-rays, and the explanation of the effects of the admission of light into a greenhouse may be here again applied to sunburn in a mist.

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IN MEMORIAM.

WILLIAM FREDERICK DONKIN.

THERE are some losses which, sweeping down on us suddenly, as a rock falls into a mountain torrent, check the current of life for a moment: there results an overflow, the reaction comes at once, and the stream runs on as before. Other calamities there are of which even the full appreciation is not the climax but the commencement of sorrow; deeper griefs, which bewilder and daze at the onset, then gradually increasing in intensity as time rolls on, affect in some measure the whole course of existence. Of this latter nature, to all who knew the man, must the loss of the Honorary Secretary of our club be. This is not the place, nor is there need to hazard conjecture of the nature of the disaster that laid our friend to rest. Enough that there is the certainty now that a brave and true heart beats no more, and that the mountains have claimed a dear life that we who remain can ill spare.

William Frederick Donkin was born on December 2, 1845. He was educated at Eton, and, in 1864, two years after leaving that school, entered at Magdalen College, Oxford, obtaining a natural science demyship. He took his degree in the natural science honour school in 1868. He remained at Oxford and held several appointments; among others he was assistant demonstrator in the University laboratory for a time, and lecturer in natural science at Keble College. In 1877 there fell on him the shadow of a loss the depth of which none may estimate. Within a year of his marriage he became a widower: his infant child lived only two days. The depth of affection of which natures such as his were capable is almost terrible to contemplate when we think of the risks of life. His health failed. Time, the great healer, seemed to have no power. Yet at length a measure of relief came. It is by no means fantastic to assume that while wandering in the Alps 'all at once Great Nature spoke to him,' or to believe that the love he had for the mountains was deepened by an ever-present sense of gratitude. In 1880, on the advice of his friends, he came to London, finding an opening as Lecturer on Chemistry in the Medical School of St. George's Hospital: and it was then, eight years ago, that our acquaintanceship began. It seems but a few days since, for the time was too short, far too short, to learn all the beauties of his nature. We who were associated with him in work knew him to be the most patient and conscientious of teachers; unassuming almost to a fault; impressed in every act of his life with that earnest craving for truth which is the very essence of scientific work; with a simplicity and unselfishness of character that scientific habits and surroundings could only develop, and failed wholly to warp, as happens at times to minds of more narrow calibre. There was all this; there was also a charm that never failed to attract, especially to those who could see a little beneath the surface of a naturally reserved nature. Some may realise the influence the more now that he can exercise it

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no longer. Such a character made itself felt at once, but more than repaid study. Would that words could be set down which might adequately portray it.

Donkin was attracted by and had a wide knowledge of many subjects besides chemistry; he delighted in the study of any branch of physics. In working at the modern developments of lighting, electrical and other, he found scope for his beautiful dexterity of manipulation, and it was in this branch of his professional occupation that he promised to do his best original work. His opinion was highly valued by a well-known electrical firm, to whom he acted as scientific experimenter. Indeed, in the opinion of one well qualified to judge, he was rapidly making his mark as a leader in experimental investigations requiring high chemical and electrical knowledge. He loved to take in hand a delicate piece of mechanism, such as an aneroid or watch, when it was out of order. It was characteristic of him that, intent on the contemplation of the main object to be attained, in taking the apparatus to pieces he invariably mislaid the little detached parts. All were put carefully away in different places; and desperate searches resulted. But when found all the several parts were fitted together with an ease and certainty and happiness of result that were surprising.

Of his ability as a musician it is for others to speak, and it is mentioned here only to illustrate one marked phase of his nature. His power of attention—a rare quality—was remarkable in all matters, but when playing his favourite instrument became so intense as to absorb him utterly. Music spoke to him with a depth and clearness of expression denied to most of us, and reserved only for her chosen disciples. Yet more: for I think it was only when under the influence of music that he gave rein to the memory, and allowed the saddest episode of his life to float for a while in his mind.

As in music so also in photography, he was a true artist. That much-abused term is not misapplied in this instance. The field of Alpine photography had been well worked when he took it up and developed it to the point it has now reached, or, in other words, the point which he reached. So accustomed have we become to regard his Alpine views as pre-eminent that it is difficult to realise they have for so few years been before the public; yet it was only at the Winter Dinner Exhibition in 1880 that he exhibited his panorama from the summit of the Dom, a work that excited the admiration of all who knew the Alps, and must have almost revealed a new world to those who did not. In his photographs he regarded the mountains more from the sculptor's than the painter's view-point. The massiveness and solidity of the peaks and glaciers, their symmetry and grandeur of form and line appealed most to him. Witness such plates as the Matterhorn from the Hörnli, the famous view of the Aiguille du Géant and Mont Blanc, or the Dent Blanche from the Italian side of the Cervin. Yet there was no phase of the mountains which came amiss to one who, in his own quiet way, was so ardent a lover of the Alps. It would scarcely be possible to surpass in delicacy the views of the Bietschhorn from the Petersgrat, or of the Aiguilles Verte and du Dru

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from Trélaporte, while to my mind the most perfect snow photograph yet taken is that of Mont Blanc from the Aiguille du Midi. Such works must live, and will form the most fitting memorial of the man. Improved methods (and he was never fully satisfied with results achieved, but was constantly seeking to improve on previous work) may yield still better results, but he must ever have the credit of having been a pioneer in Alpine photography and of having raised it to the level of a distinct art. The secret of his success was simple enough; he had the refined perception of an artist, the special training necessary, a constant desire to do better, and an unlimited capacity for taking trouble in the work which was his chief pleasure. Of the work of others in the same line he had the most honest appreciation, for there was no shred of narrowness in his character. He rarely showed enthusiasm openly, but I can well remember the terms of boundless admiration in which he often spoke to me of the photographs of a well-known Italian member of our club, and the rapt way in which I have seen him studying their delicate beauty.

In 1885 he undertook the duties of Honorary Secretary of the Alpine Club, though not without some natural reluctance, for he was a man of many occupations, and had little leisure for the work. Although he had not been many years a member, his name was so familiar to all that his accession to the office seemed almost natural. It is no secret that the work entailed was uncongenial, and it was only the warm interest that he had in the club that prompted him to undertake it. Not that he was one to shirk responsibility, but he shrank characteristically from putting himself forward. At times, I fear, the work pressed heavily on him. The labour of organising the winter dinner and picture exhibition increased every year. His very conscientiousness and faculty of concentration were unfavourable to what is spoken of as business-like habits of mind, and the labour was thereby increased. With what unfailing sweetness of manner, and with what benefit to the club he conducted its business, we all know: perhaps those know best who were chiefly associated with him in the work, and can estimate the innumerable calls made on the time and patience of an Honorary Secretary who has to bear also the responsibilities of a treasurer. Donkin was a fine example of a rare combination—a man of character and without enemies. He won the esteem of all, while never seeking for popularity. 'I met him only on a few occasions,' one writes, 'but each time left me indebted to him for some service rendered, some act of kindness.'

As a mountaineer he had wide experience and sound judgment, and at critical moments, when the occasion demanded, would speak with a decision that would have surprised those who knew him but little. Though not particularly robust, he could husband his strength so well as to be always ready when wanted. Animated by an object beyond that of mere climbing, he never suffered his attention to relax, and at the end of a long expedition was as careful and safe as at any other time. Mountaineering was with him greatly a means to an end; but he studied to perfect himself in the means, as he studied everything he took up. It was no act of carelessness or inattention that cost him

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his life. It was through no want of foresight that this dark shadow has been cast over the mountains.

He is gone. But his influence remains. The work of his Alpine life remains. So may we recall him as it were at will. The pictures, it has been said, that are drawn in our minds are laid in fading colours. But the shock of a great calamity or loss can strangely stimulate the memory, and enable us to reproduce in startlingly perfect focus the dormant image of what has taken place long ago. The picture of the open valley of Betsho one August day rises up before my eyes, perfect in every detail. The events of that morning revolve again and again in an unceasing order in the memory. Unbidden the recollection comes of the busy preparations for the start, and the merriment over the morning meal, for by tacit agreement we would not anticipate even for an hour. Of a sudden we seemed to realise that the moment had arrived, and that all was ready for departure. Little was spoken. A silence seemed to gather around us. Strange that nothing was said of meeting again soon, yet so it was. The time had come. A shake of the hand, a pressure on the shoulder that meant more than words could express. The guides and then Harry Fox moved on a few paces. Donkin was before me—ay, as he is now as I write. I can see him, I can almost feel his grasp. God bless you, old friend. Good-bye. C. T. DENT.

The following details of Mr. Donkin's Oxford career will be of interest to his numerous friends in Oxford and elsewhere. He was the eldest son of the late Mr. W. F. Donkin (from 1842 to 1870 Savilian Professor of Astronomy in the University of Oxford), and was himself born in Oxford. On October 15, 1864, he was elected and admitted a Demy of Magdalen College, Oxford, having obtained his scholarship for proficiency in Natural Science. After four years of study at Magdalen he was placed in the second class in the Final Honour School of Natural Science in Michaelmas term, 1868, there being but one man that time in the first class. He had taken up chemistry as his special subject for examination, and he continued to study it after taking his B.A. degree. In 1872 he proceeded to the degree of M.A. In Michaelmas term, 1875, he was appointed Lecturer in Natural Science at Keble College, and in Michaelmas term, 1877, Tutor at the same college. He held both appointments till Trinity term, 1880. In 1879–1880 he served as one of the examiners in the Final Honour School of Natural Science.

He was for some time assistant to the late Sir B. C. Brodie, Professor of Chemistry in the University of Oxford. He also held the post of County Analyst for the county of Oxfordshire, with a private laboratory at the New Museum. His neatness and dexterity in making complicated apparatus in glass was unrivalled, and some specimens of his work are to this day preserved in the Museum.

After ceasing to reside in Oxford in 1880, he often came down to take part in the concerts of the University Musical Society, and to attend the meetings of the Oxford Alpine Club, of which he had been a member since November, 1879, being elected into the London

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Club a month later. The Oxford A.C. has this year given up its usual autumn meeting as a mark of respect to the memory of one who generally came down at that time to tell us of his doings in the mountains, and to show us his marvellous photographs.

W. A. B. Coolidge.

HARRY FOX.

Harry Fox, who was the chosen companion of Mr. Dent and Mr. Donkin in their second expedition to the Caucasus, became a member of the Alpine Club in 1885, but in a comparatively short period had not only won for himself the reputation of a bold, skilful, and enthusiastic climber, but numbered a host of warm friends amongst our members who will, I feel sure, bear me out in saying that not mere community of taste and pursuit, but a feeling of hearty affection, united them to him in no ordinary degree.

He was born on September 30, 1856, and was the second son of the late Mr. Dilworth Crewdson Fox, of Woodlands, Wellington, Somerset, where he was actively engaged as a partner in a large manufacturing business, and, as such, as well as by his geniality, public spirit, and wide usefulness, acquired much influence, and the respect and love of all classes of the community. It was not till the summer of 1884 that he tried the great mountains for the first time, and at once lost his heart to them for ever, as many others of us know what it is to do. He first acquired proficiency in climbing under the auspices of Mr. Graham, and he always gratefully regarded that brilliant mountaineer as his original model and instructor in the craft, though his skill and powers were subsequently still further developed in company with Mr. Slingsby, to whom he was deeply attached. Alone with guides, or in company with relatives or other friends, amongst whom I may specially mention Messrs. R., H., and L. Powell, in addition to those just named, he accomplished a very considerable number of expeditions, many of them of first-rate difficulty. The Fletschhorn, Rimpfischhorn, Mischabel Joch, Mont Collon, Aiguille de la Za, Ober Gabelhorn, and Aiguille du Dru were all climbed by himself and various friends without guides—a porter, however, being of the party in the case of the Ober Gabelhorn, and poor young Fischer (in the same capacity) in that of the Dru. Not to name minor excursions, he had also ascended in the orthodox fashion the Eiger, Aletschhorn, Jungfrau, Mönch, Finsteraarhorn, Wetterhorn, Gspaltenhorn, Schreckhorn, Matterhorn, Dent Blanche, Aiguilles de Blaitière and des Charmoz, Dents des Bouquetins, Zinal Rothhorn, &c.

I am indebted to Mr. Slingsby for the following very interesting remarks on his characteristics as a mountaineer and comrade, a subject on which no one is so well qualified to speak:—

'It was my privilege to make with Harry Fox, during the summers of 1886 and 1887, many good mountain expeditions in the Alps, principally without guides. I have no hesitation in saying that he was the best amateur climber I ever met. He was as equally at home on difficult rocks as in forcing a way on an intricate glacier or in step-cutting upon a steep snow-slope, in plan-

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ning a difficult expedition as in executing it. In physical strength and endurance, which were largely owing to his extreme temperance and perfect self-control, few were his equals. He had great powers of organisation, and hardly ever neglected even the smallest detail. His perfect unselfishness made him ever anxious for the comfort of others. He was a born leader, and his intense enthusiasm, quickness of observation, and sense of humour made him at all times a most delightful companion. He was both brave and gentle, and, when occasion required, was the tenderest of nurses. His brightness was unfailing, whether revelling in the sunshine on Mont Collon, descending the Aiguille du Dru in a snow and thunder storm, or cooking our supper at the camp-fire. His naturally eager nature had been tempered by prudence, and as an illustration I may mention that, when we were descending the Gabelhorn, we noticed a steep couloir below the Unter Gabelhorn which a novice might easily think might be crossed with safety. Fox said, "Nothing could ever persuade me to cross such a place." Directly afterwards the couloir was swept by an avalanche, and yet, a few weeks after this, a Zermatt guide led an English tourist over this very place, and had a very narrow escape. Fox was an immense favourite with guides, and never failed to gain their confidence.'

This is not the place in which to lay bare the sacred recesses of private sorrow. What desolation, borne with conspicuous patience and submission, such a loss has caused in his family circle can well be imagined by all who knew Harry Fox's bright affectionate nature, his ever ready sympathy and helpfulness, his practical capacity for work and organisation of every description, and the warmth of as loyal and unselfish a heart as ever beat.

I may, however, be permitted to say that in his county, and indeed far beyond its limits, he was widely known and, where known, admired and beloved by troops of friends. His bright eager face and the cheery ring of his voice were warmly welcomed in the cricket or football field, whether he appeared as a player, umpire, or keen onlooker, no less than in ordinary social intercourse. His range of interests, in duty and pleasure alike, was wide, and 'nihil tetigit quod non ornavit' is no exaggerated expression as applied to him, whether the deeper or the lighter phases of life were concerned.

Combining prudence with boldness and skill in his mountaineering achievements, I cannot for a moment attribute his early death to any excess of daring or rashness, still less to ignorance or carelessness. I must sorrowingly be content to believe that, with his and our valued friend Mr. Donkin and their trusty guides, whose loss we likewise deplore, he has fallen a victim to some sudden and unforeseen—perhaps unforeseeable—swift form of destruction, such as an avalanche, which no general experience or care can absolutely guard against, especially in only partially explored districts, where dangers are, to some extent, hidden from pioneers, and can only be fully appreciated and avoided as knowledge increases.

Few such events—shrouded, too, as this is, in a mystery which may long defy solution—have caused so painful a sensation since the tragedy of the Matterhorn, and there are some of us who feel that, however inaudibly to others, an added note of sorrow will blend henceforth with the undertones of life,

'and the veil of our heads will be grief, and the crown will be pain'

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for many a year to come, as we think of such a bright and useful career cut short, whilst

. . . . 'our tears
Thaw not the frost that binds so dear a head.'

F. F. TUCKETT.

KASPAR STREICH.

THE disaster in the Caucasus which has cost our Club two valued lives, including that of our gifted secretary, has also plunged into mourning a little home at Willigen, near Meiringen, and has left to us the sacred duty of coming forward to comfort and assist the young widow and children of poor Kaspar Streich.

It is some years ago now since Streich joined me as leading guide. He had done a good deal of work, under the well-known guide Hans von Bergen, with Mr. Seymour Hoare, and it was on Mr. Hoare's recommendation that I first engaged him.

I have never since had cause to regret my confidence in him. For several consecutive seasons we have worked together in the Oberland, and I have found Streich ever steady, ever brave, ever true.

Had human skill been of avail to avert the sad disaster on the lonesome peak or glacier in the remote Caucasus which has pained us all so deeply, it was there in Streich. He had studied long in the best school for mountain guides—the Swiss Oberland—with such companions as Johann Jaun and Hans von Bergen, until he came to combine in himself all the qualities of a first-rate guide—daring with caution, experience with great strength and endurance.

Notwithstanding his merits as a leading guide he was modest and self-sacrificing. Calm and steady, he inspired confidence into others; and I have always felt, when with him on many a difficult enterprise, that I had by my side a firm friend who would be faithful and true even unto death.

In whatever circumstances it may have been that disaster overtook poor Donkin's party, of this I feel convinced, that Streich never faltered, but did his duty to the end like a brave and loyal man. Streich was about thirty-eight years of age. He has left a widow and four young children, the youngest but a few weeks old.

F. J. CULLINAN.

JOHANN FISCHER.

JOHANN FISCHER was a native of Zaun, near Meiringen, and a son of Johann Fischer who was killed on the Brouillard Glacier in 1874. He was about twenty-one years of age. He was a fine, strongly-built young man, who appeared to have a happy and brilliant future before him. There is little doubt, that had he not lamentably been cut off at so early an age he would have become one of the leading guides in the Oberland.

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He spent the winter of 1886–7 with Emile Rey at Courmayeur, where he worked as a carpenter and learned French and the duties of an Alpine guide. He remained with Rey through the spring, and accompanied him as second guide in most of the expeditions which the latter made last year. Amongst these were the ascents of the Aiguille des Charmoz and Aiguille de Blaitière by Mr. Harry Fox.

As I have only made one mountain expedition with Fischer, I am well aware that I cannot personally testify to some of the rarer qualities possessed by a first-rate guide, which I have little doubt that Fischer was already endowed with, or would soon attain to. This expedition, however, the ascent of the Aiguille du Dru, was of an unusual character. Four amateurs met on a certain day at the Montanvert, by previous arrangement, for the express purpose of attempting the ascent of the Aiguille du Dru without guides. At the last, Harry Fox and I agreed that it would be advisable for us to have a porter as a reserve of strength, as one of our party was not in very good training, and we feared that he would probably not reach the top. Accordingly Fox suggested Johann Fischer, who had made the ascent once before. After Emile Rey had added his persuasive powers to ours, Fischer consented to go. Though Fox and I were the actual and responsible leaders, the bulk of the work was done by Fischer. He did everything that we required of him as well as it could have been done, and he and Fox cut all the steps that were required up the icy wall of the bergschrund, which was peculiarly difficult to surmount last year. Shortly after leaving the summit we were overtaken by a very heavy snow-storm, which was soon succeeded by a most terrific thunderstorm. This would have unsteadied many a poor guide, yet Fischer was perfectly cool and collected, and when he was holding the rope, one felt that he was almost as firm as the rocks upon which he stood. He carried our food, and cheerfully shouldered a cruel burden from the gîte down to the Montanvert.

We were so well satisfied with Fischer that we paid him the full guide's tariff of 100 frs. Rey was delighted at the success of the expedition, and was extremely proud of his pupil.

To the reputation he brought from the Alps he added in the Caucasus. Mr. Dent tells me that he was always willing, thoughtful, and attentive: and that as a companion he was invaluable in camp, while steady and sure in the mountains. He adds that the diary Fischer kept in the Caucasus shows him to have been possessed of an intelligence and power of observation far above the average run of guides.

The Oberland has lost one of its most promising sons, mountaineers have lost a capital young guide and most cheery companion, and the cold shadows of the Alps have fallen darkly for the second time on a little Alpine home and a widowed head. WM. CECIL SLINGSBY.

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ALPINE ACCIDENTS IN 1888.

It might have been hoped that the extremely unfavourable weather of the past season would have had at least one good result—the diminishing of the number of Alpine accidents. This, however, has not been the case, and it is once more our sad duty to record the loss of many lives in the course of mountain excursions. It is to be noted, however, that but two, or possibly three, accidents (those in the Tatra, on the Lahnscharte and on the Dachstein) seem to be even indirectly due to the remarkably bad weather of the season. Further, with a single exception, all the accidents we have heard of occurred below a height of 10,500 feet, that is, not on any of the higher and more difficult peaks.

This single exception is the accident which occurred on the Weisshorn near Randa. Herr Georg Winkler, of Munich, climbed the Zinal Rothhorn from Zinal on August 14, without companion or guide, and on the 16th started to ascend the Weisshorn from Zinal in the same solitary fashion. As nothing was heard of him for several days, search parties were sent out, one of which found, on August 29, a woollen cap and a photograph (both identified as belonging to him) in the remains of a recent avalanche, which had doubtless overwhelmed and carried away the unfortunate climber. It is conjectured that he had not reached a greater height than 3,800 mètres (12,468 feet). A full account of the search will be found on pp. 227–8 of No. 3, 1888, of the 'Echo des Alps' just published. Herr Winkler, though a young man, was a very expert climber, and of remarkable bodily strength. During the last two seasons he had successfully assailed the most difficult rock peaks in the Dolomites, but had not much experience on ice and snow. It is scarcely necessary to point out that solitary ascents of great peaks, though now and then successfully achieved, are the most dangerous form of climbing. Solitary climbing on ice and snow-slopes sets at naught all sound rules of mountaineering, and combines in itself every conceivable danger which may possibly befall the rashest adventurer.

On August 20, Michael Innerkofler, of Sexten, one of the best and most widely known guides in the South Tyrol, lost his life under the following distressing circumstances. He had successfully made the ascent of the Monte Cristallo (3,260 mètres = 10,596 feet) from Schluderbach along with two travellers from Munich, Herren Rudolf Wiesbeck and Gustav Dimroth, the rope not being put on at all. The descent was commenced at 7.45 A.M., the rope now being employed, and the Cristallo Pass (2,826 mètres=9,272 feet) regained about 9 A.M. About 50 mètres (164 feet) below the pass on the Schluderbach side, a great crevasse stretches across the entire breadth of the glacier at the head of the Val Fonda. According to P. Dimai, the guide, it was 18 feet (3 klafter) broad and 120 feet (20 klafter) deep. This was the scene of the accident, which is thus described by Herr Dimroth in a letter printed in No. 18 (September 15, 1888) of the *Mittheilungen* of the German and Austrian Alpine Club (p. 222). (This account is

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naturally of higher authority than several others which have appeared in the papers.)

In a quarter of an hour we came to the crevasse which stretches across the entire glacier, and which is usually crossed by a snow-bridge, a course we had taken on the way up. I went first, then 4 mètres (13 feet) behind came Wiesbeck, and 5 mètres (16⅓ feet) behind him was Innerkofler. The slope just above the upper lip of the crevasse is very steep, so that it is necessary to cut steps. I descended and stepped gently, without jumping, on the snow-bridge, which at once broke in under me. My two comrades were pulled down after me, even Innerkofler not being able to get a firm hold in the ice-step with his axe. Wiesbeck and I fell down, on the snow which had formed the bridge, about 15 or 20 mètres (49 to 66 feet), but were lucky enough to keep in a standing position, so that we received only unimportant injuries. Our unfortunate guide fell a mètre (3 feet) further, head foremost, into a crack, but he had already had his skull fractured by coming into contact with the ice-wall. We pulled him up at once and set him on his legs; he still showed signs of life, but was unconscious. We untied the rope and shouted for aid. Twenty minutes later the guides P. Dimai and Siorpaes arrived, having in that short time descended from the summit (which they had reached with two other parties). They let down two ropes, to which we tied Innerkofler. Scarcely had he been drawn up than we heard the cry, 'He is already dead!' We were drawn up in turn, and, after waiting till the other travellers rejoined us, went down to Schluderbach. The guides came in with the body at 4 P.M. The doctor found that the skull and ribs had been fractured.

The body was later taken on to Innerkofler's house in Sexten, and buried in the churchyard of his native village (which he had steadily refused to quit for Schluderbach) in the early morning of August 22. The funeral was largely attended, the German and Austrian, and the Austrian, Alpine Clubs being represented. Innerkofler was rather over forty years of age, of very powerful build (though of middle size only), and of enormous strength. He was the first to ascend the chief mountains of his native valley, such as the Zwölferkofel (in 1874), Elferkofel (in 1878), and Sextner Rothwand. Two of the Drei Zinnen, the Croda di Lago (in 1884), the Croda Rossa from Schluderbach, and the Grohmannspitze were all first climbed by him, while he had discovered two new ways up the Monte Cristallo. He was passionately fond of chamois-hunting. He was unmarried and it is stated that he was fairly well off, having saved most of the money he had earned as guide.

According to Herr Dimroth's account, the accident seems to have been due to a bit of ill-luck. A bridge broke through which had been crossed safely in the morning. In such a case, one man can scarcely hold two falling suddenly, unless he has a firm hold. Herr Dimroth, however, expressly states that Innerkofler could not get such hold despite several attempts ('auch der Führer konnte nicht widerstehen, da er auf der Eisstufe trotz vorherigen Einstemmens des Eispickels keinen festen Halt fand'). There appears to be no ground for the imputations of carelessness which have been made in several foreign papers, though we cannot but be surprised that so brave and skilful a mountaineer should have fallen a victim in a comparatively easy place. A snow-bridge is always a more or less dangerous obstacle, for it is very difficult, sometimes impossible, to say with certainty whether it will bear or not, even though it may have been crossed quite easily a very few hours before.

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According to a Vienna telegram in the 'Standard' of October 9, a Viennese climber, Herr Reinhold, lost his life recently on the Cimon della Pala (3,186 mètres=10,453 feet, according to the latest survey), in the Primiero Dolomites. He had been missing for a week past. The body was found fearfully mutilated, having been torn and gnawed by wild animals. The unfortunate man must have missed his footing in making the ascent of the mountain alone, and have fallen a considerable depth. He was not killed by the fall, but was frozen to death. The Cimon was formerly considered one of the most formidable peaks of the Alps, but of late years has been so frequently climbed that it had lost most of its terrors.

Two lives were lost on July 25, on the Dachstein (9,829 feet), in the Salzburg Alps. We take the following details from the narrative given by Herr Schönmetzler, one of the survivors.* A party, consisting of that gentleman, Herr Tannheiser, and Dr. Zeidler, with the guide Johann Steiner, had the intention of ascending the Bösenstein (8,035 feet), but decided to try the Dachstein from Schladming, although there was a great amount of snow on the mountain. The snow proved to be very deep, but the summit was successfully reached. On the descent, the party had passed the spot where iron clamps have been fastened into the rock, and were going down a snow-slope, the guide in front, cutting steps, when Dr. Zeidler slipped and fell over a short snow-field and down a precipice, dragging with him Herr Tannheiser, who had tried to help him. Herr Tannheiser was killed on the spot; Dr. Zeidler died soon after his comrades had come down to him. It would seem that the party were unprovided with a rope, and that the guide alone had an ice-axe; so that, taking into account the bad state of the snow and of the mountain generally, the causes of this sad accident are but too clear. It is sometimes absolutely necessary to take special precautions on a comparatively low peak, while on a great peak no one would think of neglecting to use rope and ice-axes.

Two accidents are reported to have taken place on the Dent du Midi (3,260 mètres = 10,596 feet). We are enabled through the kindness of Mr. R. F. Ball to give the following authentic account of the first of these mishaps, most incomplete and misleading notices of which have appeared in the papers.

My brother Mr. Llewelyn Ball and I, starting from Champéry with a guide early on the morning of August 11, gained the summit of the Dent du Midi in seven and a quarter hours and, after three-quarters of an hour's rest, retraced our steps to the Col des Paresseux.

I here dismissed the guide, and we went on without him towards the pastures of Salanfe.

A long and gradually decreasing incline of snow, ending in a plateau of plainly visible rocks, tempted us to glissade, which we had many times successfully done together, both on this day and on previous excursions. My brother seated himself behind me. We started slowly, and slid for some distance at a steady rate, when he began to swing to one side, and our pace consequently increased. I then found that the surface-snow was moving with us, and my ice-axe, striking an ice-coated rock concealed by the snow, was

* Printed in No. 16 of the *Oesterreichische Touristen-Zeitung*, August 15, p. 193.

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torn from my hands. My brother at the same moment lost his alpenstock, and we were separated, sliding on to the bottom of the slope about ten yards apart from each other, he going feet first, I head first. The latter part of our descent was checked by the decreasing slope, and I finally stopped on the plateau of rocks, one of which cut my forehead, but I received no other injuries. My brother unfortunately fell into a small couloir, not more than five or six feet broad at the top, which we had not seen from above. I saw him go down and at once searched the couloir, but was surprised and horrified to find no trace of him. The stream of snow, though very slight, had been sufficient to cover him, and I can only suppose that he had also been embedded in old snow in the couloir. I obtained assistance as soon as possible from the neighbouring chalets, and guides from Salvan and Champéry, and further search was made; but the body was not recovered until August 15.

On August 20 five German artisans, of Montreux, were following an English party up the peak when, above the Col des Paresseux (which is 3,001 mètres = 9,847 feet in height, and but a little way below the summit on the ordinary route from Bonavaux), one of them, a young fellow 18 years of age, A. Pietri (or Pétri) by name, stepped on a steep snow-slope and fell over lofty precipices on the Salanfe side of the mountain. The body was found immediately afterwards. It is said that the young man was making his first 'grande course,' and was not a practised climber. It is stated that the party were unprovided with a rope or ice-axes, having only alpenstocks.

Among the many fatal accidents on minor heights, the following may be mentioned.

In the early part of this year a young French officer, Lieutenant Meyer, of the 158th Foot, in command at the Fort de l'Olive, not far from Briançon (Dauphiné), disappeared. As no traces of him could be found after careful search, a court-martial at Grenoble condemned him to six months' imprisonment and loss of his commission for the offence of being absent without leave for over three months. Towards the end of August, while a party of the 30th battalion of 'Chasseurs alpins' was passing beneath the Fort de l'Olive, on their way from Monestier to Plampinet, one of the pack-mules fell down a precipice. The animal was killed, but when some soldiers went down to bring up its load, they were amazed to find the body of an officer of the 158th regiment. This was soon identified as that of the unfortunate Lieutenant Meyer, who had perished accidentally in some unknown way.

On August 6 M. Abel Bergaigne started at 8 A.M. from La Grave in Dauphiné, to take a walk in the forest opposite the village. As he did not come back in the evening a search was instituted, and his body finally discovered in a ravine on the south side of the valley of the Romanche, opposite the waterfall of the Sault de la Pucelle near the little village of Les Fréaux, at a place known as the 'Ruisseau des Vaches.' He was probably climbing up some rocks in order to return to La Grave by way of the beautiful lake of Puy Vacher. He is believed to have slipped on a rock and to have fallen down a slope of 300 feet, followed by a rock precipice of a few feet, his head striking against one of the great stones in the stream, and death resulting at once from a fractured skull. M. Bergaigne was fifty years of age. He was the professor of Sanskrit at the Sorbonne in Paris, and (since

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1885) a member of the Académie des Inscriptions. An English literary journal speaks of him and his works in the following terms:—

> He was, perhaps, the best known of the younger school of French 'Indianistes.' His most important work was an examination of the religion of ancient India from the materials supplied by the Rig Veda (3 vols. 1878–1883), in which he enounced views of a very novel character. Latterly he had devoted much attention to the decipherment of the inscriptions from Cambodia.

On the way over the Forcola di Cristallina (8,481 feet), an easy pass between Bignasco and Airolo (Ticino), Signor Attilio Sirtori, member of the Milan section of the Italian Alpine Club, was killed on August 25. He had started early up the Airolo side of the pass, and had gained a height of about 7,874 feet, when at a point where the path leads above a rock wall he lost his footing and fell into a mountain torrent, which carried him down to a shelf of rock where he was found, with his skull fractured.

A young lawyer, Herr Albert von Brandis, of Cracow, started on July 18 from Bad Schmeks to make the ascent of the Gerlsdorfer Spitze the highest point (8,000 feet) of the Tatra range (Carpathians). He was accompanied by Johann Mahler, the most experienced guide of the district. The weather was very unfavourable when they started. That same night at 11 P.M. they were found in a terrible state. The guide was dead; the traveller very much injured. It appears that they had been overtaken, during the ascent, by a terrible hailstorm; but, as darkness was coming on and it was very cold, they dared not halt, and came to an icefield, which gave way under them. They were precipitated 100 klafter (600 feet), and it was only after many hours that the traveller's cries for help were heard, and a rescue party discovered him and his unfortunate guide.

On September 24, two officers of the Pioneers in garrison at Pettau, Lieutenants Valenta and de Vall, started alone from Raibl (in Carinthia) in order to rejoin at Weissenfels (in Carniola) some comrades with whom they had been taking part in artillery practice. They intended to cross over by the hut built on the Manhart or Mangert (2,678 mètres = 8,787 feet) in the Julian Alps by the Villach section of the German and Austrian Alpine Club. All went well till within half-an-hour of the hut, when they turned to the right instead of to the left and lost their way. Finally, after losing two hours, they resolved to cross the Lahnscharte (2,250 mètres = 7,382 feet). By this time mist and storm had come on, and they only once caught sight of the Weissenfels lake below. They appear, after many wanderings while going down from the pass, to have attempted to descend by a wrong route (too far to the east) through a grassy *combe*, which ends in *éboulis* and steep rocks. Lieutenant Valenta went first, aiding himself by means of his sword, but slipped and fell about 50 mètres (164 feet), and was killed, his skull and ribs being fractured. His companion, alone at an height of 2,200 mètres (7,218 feet) retraced his steps, but had to spend the night alone high up without food or covering. He regained Raibl next day and search parties were sent up, which recovered and brought down Lieutenant Valenta's body. It is said that the way over the

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Lahnscharte is rather hard to find, and a little while before some other officers lost their way in that quarter.

Several accidents to youths and boys engaged in gathering eidelweiss are also reported.

On September 14 Mr. George A. Rudd, an American artist, left Ala for Bormio in the Valtellina, where he was to have rejoined his family on the 18th. As he did not arrive, search was made for him. It has been ascertained that he reached Tione in the diligence, passed through Pinzolo at noon on the 15th, and left the same evening for the Bedole hut at the head of the Val di Genova and at the foot of the Adamello. He slept there on the night of the 15th, and left at 7 A.M. on the 16th, after writing his name in the book. His name has also been found scrawled on the door of the Leipzigerhütte (then closed) 2½ hrs. higher up; but despite the most careful search, no further traces have been found. It is known from his statements at Pinzolo that he intended to cross the high but easy Passo di Presena (9,764 feet) to Ponte di Legno in the Val Camonica. On the N. side of the pass it is necessary to cross a level glacier, where the unfortunate traveller may have perished. He was a member of the German and Austrian Alpine Club.

The following may be more fitly described as deaths occurring on the mountains than as Alpine accidents. Herr Rudhard, a local Government official, was found dead on the path between the Ester Alp (4,167 feet) and Barmsee (3,071 feet), after having made the ascent of the Krottenkopf (6,946 feet) in the Bavarian Highlands, not very far from Ober Ammergau. As the path is perfectly easy, and Herr Rudhard, though no longer young, was a good climber, it is supposed that he succumbed to a sudden illness. On August 11, three young girls —two sisters and a friend, Fräulein Adele Kaida—all of Gratz (Styria), and spending some time at Wald (Styria), made the easy ascent, without any companions, of the Zeyritzkampel (6,972 feet). On the way up, Fräulein Kaida had complained of want of breath and rapid beating of the heart. She, however, reached the summit, but about a quarter of an hour after starting on the way down, and while a discussion was going on as to the right way, she suddenly fell to the ground. Her friends tried by every means in their power to revive her, but in vain. The body later slipped down some rocks, and received several external injuries, but the medical examination showed that death was not caused by the fall, but by heart disease, aggravated by tight lacing and the great heat of the day. On August 17, Mr. J. J. Reynolds, of Hereford and London, aged 64, died suddenly on the summit of the Schafberg (Austria); and on July 29, a French tourist, M. Longuer, died at the Bel Achat hut (6,975 feet), on the Brévent, after a night of great suffering. In the course of October the body of Dr. Victor Schieck, of Döbeln in Saxony, was found on the Sursass Alp, on Swiss territory, above Remüs in the Lower Engadine. It is feared that he has been either murdered by some shepherds, or robbed by them after succumbing to sudden illness. Two men have been arrested on suspicion.

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Such is the death-roll in the Alps during the summer of 1888. It may be well to consider a little more closely the precise causes of this lamentable loss of life.

In one of the mishaps enumerated above (Innerkofler), the breaking of a bridge of snow was the occasion of death, one member only of the party perishing, though all three fell together. In another (Mr. Ball), a glissade down a gentle snow-slope ended fatally. It would appear from the authentic accounts of both mishaps that the unfortunate victims met with their deaths through mere mischance, and not by any fault of their own.

The rest, however, of the fatal occurrences we have chronicled came about through the deliberate breaking of well recognised rules of mountaineering. It is to be hoped that these repeated examples of the consequences attending the neglect of the precautions warranted by the accumulated experience of several generations of climbers, will weigh with even veteran mountaineers (still more with those of fewer years' standing), and make them realise that it is their duty to enforce the observance of such precautions, not only by precept but by example. Thus, the absence of the rope on the Dachstein and on the Dent du Midi (the Pietri accident), and in the latter case also, apparently, of an ice-axe, was the direct and certain cause of the catastrophe.

By far the larger number of these accidents were, however, the direct result of the dire and growing fashion of solitary climbing, which cannot be justified on the score of economy (as may conceivably be the case with guideless climbing), and seems to be due either to a sensational desire for notoriety or to sheer inexperience and recklessness. Visitors to Zermatt in 1887 will remember the sensation caused by solitary ascents of the Rothhorn, of the Weisshorn and of the Matterhorn. It is true that on August 10-11, 1888, M. Pierre Puiseux, alone, succeeded in safely ascending Mont Blanc by way of the Aiguille du Goûter, a case to be carefully distinguished from Mr. Morshead's accidental solitary ascent on July 21, 1864, but very much the same as that of Mr. Mather on August 22, 1873.* But it is also true that Herr Winkler on the Weisshorn and Herr Reinhold on the Cimon della Pala did not return alive from their solitary expeditions. While mountaineers are practically unanimous in most strongly condemning solitary ascents of high mountains, particularly of snow peaks, less may be urged against solitary wanderings below the snow-line. Yet though it has its pleasures, it has its dangers also. Sudden illness may entail fatal results to a solitary traveller, as in Herr Rudhard's case, where there might have been some chance for him if he had had a comrade. A slip even on a path may, as on the Cristallina Pass, end in the same way, owing to the absence of any help. Travellers, too, who are not experienced climbers, may perish in the course of an easy walk alone, like M. Bergaigne and Mr. Rudd. All this serves to show that, as a rule, solitary climbing, even below the snow-line, cannot be recommended generally, and has special dangers of its own :

* See M. Durier's *Mont Blanc*, 2nd edition, p. 183.

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above the snow-line it is the height of folly. This seems to us the main lesson to be learnt from the Alpine accidents of 1888, and it is all the more important to insist on it, because at the present time there seems to be a distinct tendency to advance from guideless mountaineering to companionless mountaineering. No doubt the mountains are better known than formerly, but mountain dangers in themselves remain the same; and though experience diminishes the risk for a party going together, it does not do so in the case of solitary climbers—rather the contrary if it leads a practised mountaineer to depend solely on himself, instead of sharing the perils and fatigues of an ascent with a trusty comrade, whether he be a guide or an amateur.

NEW EXPEDITIONS IN 1888.

[The expeditions recorded in the following pages are believed to have been made for the first time by English or foreign mountaineers. In cases where foreign climbers have preceded English travellers, and in some other instances, references to the original accounts have, as far as possible, been given.]

Cottian District.

Roccie Fourioun (3,113 mètres = 10,214 feet, New Italian Survey); La Guardia del Porco (3,090 mètres = 10,138 feet, Signor Bossoli's panorama). *August* 28.—The Rev. W. A. B. Coolidge, with Christian Almer, jun., climbed this peak in an hour by its S. ridge from the Colle del Colour del Porco. The route lay over easy broken rocks. A ruined cairn of unknown origin (probably built by a hunter) was found on a lower point rather to the N. of the summit.

To the N. of the peak is the Col Isaia, crossed by MM. P. Guillemin and A. Salvador de Quatrefages on September 23, 1877.* The new Italian map is wrong in attributing a height of 3,070 mètres only to the nameless rocky peak between the Col Isaia and the Col de la Traversette, for it is distinctly higher than the Roccie Fourioun, and is crowned by a cairn. (Possibly the heights of the two peaks should be interchanged.) It might be allowed to retain its old name of Monte di Marte, which appears, with a height of 3,100 mètres, in Signor Bossoli's panorama from the sanctuary of San Chiaffredo.†

Passo delle Forciolline (c. 3,050 mètres = 10,008 feet). *August* 29.—The same party, starting from the inn on the Piano del Re above Crissolo, crossed the col between the Viso Mozzo (3,018 mètres) and the Viso itself (ascending the Viso Mozzo *en route* in just under an hour) to the two small lakes just beyond the Lago Grande. Thence ascending by a long and lofty couloir (then nearly filled with snow), they gained the S.E. ridge of the Viso (1 hr. 20 mins. from the lakes) at a point S. of and much higher than the Passo delle Sagnette. The new pass (for which the name of P. delle Forciolline is proposed) is separated from the Sagnette by a rugged rocky peak. The descent to the great Forciolline lakes took only 15 mins., as the débris were thickly covered

* *Annuaire du C. A. F.*, 1877, p. 586.
† *Bollettino del C. A. I.*, 1875, No. 24.

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with fresh snow. Castel Delfino was gained the same evening by the usual fatiguing route.

Tête des Toillies (3,179 mètres=10,430 feet, Etat Major Français); Roch della Niera (3,177 mètres=10,424 feet, New Italian Survey). *August* 30.—The same party made the third ascent of this peak on the way over the Col Longet from Castel Delfino to Maljasset. Leaving the mule track 10 mins. beyond the boundary stone (which is far above the true col, and on the W. side of the col), they ascended over grass slopes and débris to the deep notch just S. of the peak (45 mins.). Thence in 5 mins. they skirted the base of the peak round to the S.W., and had a short and enjoyable climb of 10 mins. to the summit, gaining the final ridge between the two points. The view was very fine, as the peak is at the angle between the Varaita, Ubaye, and S. Véran valleys. A ruined cairn, a bit of a flag, and the cards of MM. P. Guillemin and A. Salvador de Quatrefages were found on the summit. The descent of the final rocks took 15 mins. Thence striking straight away to the W. the party gained the highest huts in the Ubaye valley in 1 hr. 10 mins. from the base of the peak, and Maljasset in 1 hr. 45 mins. more.

The first ascent of this peak was made early in August 1879 by Lieutenant Siccardi with a party of Italian soldiers; the second by MM. Guillemin and Salvador de Quatrefages on August 14, 1879.*

The route up the last rocks seems in both cases to have been that described above.

Péou Roc (3,231 mètres=10,601 feet, and 3,202 mètres=10,506 feet). *August* 31.—The same party made the first ascent of both points of Péou Roc. Starting from Maljasset, they remounted the Ubaye valley to the Lac du Paroird, and quitted it in 50 mins. in order to mount by the right bank of the stream from the gorge S.W. of the peak. At first the way lay over meadows, then over very steep and treacherous slopes of shale. After crossing two streams to the right they finally gained the upper pasture basin of the gorge in 1 hr. 5 mins. from the main valley, and mounted over grass to the foot of the great combe which pierces the S.W. flank of the peak (35 mins.). Mounting by the left bank of this combe, and of a couloir higher up, over easy broken rocks, they gained the main ridge of the peak just N. of the point 3,202, which was climbed in 10 mins. (1 hr. 15 mins. from the base of the peak). The highest point was, however, at the N. end of the ridge, and was gained in 2 hrs. 20 mins. from the point 3,202, along the broken ridge and its W. flank. No great difficulties were met with, but the way was very wearisome, owing to the necessity of climbing or turning the innumerable aiguilles with which the arête is studded. The highest peak is very nearly at the junction with the main Font Sancte-Toillies ridge, and does not appear to have been previously visited. The descent was made by the W. ridge till a great break in it made it necessary to climb down the broken rocks of its S. flank, thus gaining (1½ hr. from the summit) a great slope of débris not far below the junction of the white rocks of the peak with the

* *Annuaire du C. A. F.*, 1879, pp. 23–7.

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brown rocks of the col. In 10 mins. more the base of the peak was regained, whence an easy ascent of 20 mins. over grass and débris led to the Col du Tiroure. More éboulis led down to the head of the Combe de Cristillan, Ceillac being reached in 2 hrs. 35 mins. quick walking from the col.

Dauphiné District.

Gros Grenier (2,917 mètres = 9,571 feet). *September* 4.—Mr. Frederick Gardiner and the Rev. W. A. B. Coolidge, with Christian Almer, jun., and Simon Barnéoud, having ascended this peak by the E. arête * from Valloire, descended a few steps along the S. arête, and then went straight down easy slopes of rock and shale on the western face of the peak to the pastures. The highest chalets of La Motte were reached in 1 hr. 5 mins. from the summit, and S. Jean d'Arves gained the same afternoon by way of Montrond.

Brèche des Grandes Rousses (c. 3,100 mètres = 10,171 feet). *September* 6.—The same party, starting from the Refuge de la Fare, gained the Plateau des Lacs, near the Lac de la Fare, in 40 mins., and then crossing the glacier due East, climbed over easy broken rocks, diversified by snow patches, to a point on the N. arête of the southern summit of the Grandes Rousses, a short distance above the lowest depression between the N. and S. peaks, to which they descended in a few minutes (2 hrs. 20 mins. from the lakes). After the party (save Barnéoud) had ascended the Southern peak by the N. ridge, they returned to the col and all went down the upper Glacier des Quirlies, but were forced by wide crevasses and precipitous ice slopes more and more to the left (N.), close to the rocks of a great spur of the northern peak of the Grandes Rousses, over the steep lower rocks of which they finally gained the level glacier (1 hr. 10 mins. from the pass), where the usual route of the Col des Quirlies was rejoined and followed to Clavans (2 hrs. 25 mins.).

The col was reached from the West by Abbé Bayle on August 17, 1874,† but the descent on the East had never previously been accomplished.

Roche Méane (*circa* 3,700 mètres = 12,140 feet). *July* 25.—Herr G. Merzbacher, with Pierre Gaspard fils, starting from the Chatelleret hut at 1.45 A.M., reached the Col de la Casse Déserte at 5.45, whence, rounding the central peak of the Grande Ruine by the usual route, they crossed a snow-ridge and traversed the great glacier (Glacier supérieur des Agneaux) flowing E. from the central peak in a north-easterly direction to the foot of the peak, reached at 6.45. After halting for breakfast till 7.45 the party climbed up the second snow couloir (counting from left to right), and, keeping to the right, gained the main ridge at a point where a white rock emerges from the yellow-red (gneiss) rocks of the arête. Thence they kept along the N.W. face of the peak by very difficult rocks, regained the main ridge, and gained the summit of the peak at 9.30. Leaving at 10.30, the base

* *Alpine Journal*, vol. xii. p. 112.
† *Annuaire de la S. T. D.*, 1876, p. 113.

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of the rocks was regained at 12.30, and La Bérarde at 6 that evening.* The Roche Méane is the eastern spur of the Grande Ruine which towers up so magnificently above the Refuge de l'Alpe.

Sommet des Rouies from the N.W. (3,634 mètres = 11,923 feet). *July* 31.—MM. A. Reynier and C. Verne, with P. Gaspard père, J. B. Rodier fils, and Christophe Clot, starting from the Refuge de la Lavey at 3, followed the usual route up the valley to the moraine of the Glacier du Fond (reached at 5), then bearing east in the direction of the Col de la Lavey climbed up snow couloirs, rocks, and snow slopes, direct to a snow dome N.W. of the peak. This dome was reached at 11. In a few steps the ordinary route was regained, and followed to the summit of the peak, reached at 12.

Father Favrichon of the Oratory, with Christophe and Pierre Roderon, on July 23, gained the N.W. ridge by a route separated from that described above by a rocky ridge to the South, but was forced by bad weather to descend to La Bérarde without completing the ascent.

Rocher de l'Encula (3,538 mètres=11,608 feet). *September* 7.—Messrs. W. A. Greene, F. C. Mills, and F. Baker-Gabb, with P. Gaspard père, and J. B. Rodier, made the ascent of this peak by a new route over the E. face and N.E. arête. Starting from the inn at La Bérarde at 4.45 a.m., they followed the path towards the Glacier du Chardon on the left bank of the Vénéon for one hour; then, striking up to the right, climbed over grass slopes and occasional rocks for 1½ hours, whence they kept over easy rocks (bearing always to the right) to a broad snow couloir. At the head of this couloir they turned on to the N. face, intending to work across the steep snow-slopes to the summit, but owing to the bad state of the fresh snow they were obliged to take to the N.E. arête, by which they reached the summit in rather over two hours, being delayed somewhat by a heavy snowstorm. The ascent took 6½ hours' actual walking.

The return to La Bérarde was made by the ordinary route to the S.E. and the Chardon glacier.

Graian District.

Punta Nera (3,697 mètres=12,130 feet, New Italian Survey). *August* 8.—The Rev. W. A. B. Coolidge and Mr. G. Yeld, with Christian Almer the younger and his brother Rudolf, ascended this peak. They followed the usual Grivola route to the edge of the Trajo † glacier, and thence (in 2 hrs. 20 min.), keeping well to the left, under the Punta Rossa, reached the summit by easy snow-slopes, and the N.E. ridge (6 hrs. 25 min. very moderate walking from Cogne). The view was very good, the Grand Paradis and the Pointe de Gai being perhaps the finest features of it, though the near view of the Trajo glacier and the Grivola was decidedly interesting. The whole of the Graian and Pennine Alps were visible. They found on the summit a

* *Mittheilungen des D. und Ö. A.-V.*, 1888, p. 237, and entry in the Travellers' Book of the Chalet Hôtel at La Bérarde.

† The new edition of the Italian map restores the name Traso (Trajo) instead of Grivola to this glacier.

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diminutive cairn without any names, probably built by some hunter. The descent was made direct to the King's encampment on the Col de Lauzon route. A good deal of snow lay about, and much facilitated progress. The King's encampment was reached at 3.25, the summit having been left at 1.55 (15 min. halt), and Cogne regained without any hurry at 5.25.

Grand Paradis from the East (4,061 mètres=13,324 feet). Cresta Gastaldi (*circa* 3,850 mètres=12,632 feet). Col de l'Abeille (*circa* 3,800 mètres=12,468 feet). *August* 12.—The same party ascended the Grand Paradis in 3 hrs 17 min. actual walking by the usual route from the Rifugio Vittorio Emmanuele. They then turned S.E. from the summit with the cairn, and gained (13 min.) the top of a great couloir which is a very conspicuous feature in views of the Grand Paradis from the E. It is just N. of the rocky aiguille at the angle where the Grand Paradis ridge and the Pointe de Ceresole—Becca di Moncorvé ridge join each other, and its head is the next gap but one S.E. of the peak with the cairn. By this couloir, of which the upper part required care, they descended (keeping slightly to the right) to the broad snow col between the Grand Paradis and the Cresta Gastaldi, which was reached in 1 hr. 20 min. from the top of the couloir, the snow being in excellent condition. They propose to call this pass 'Col de l'Abeille,' after a bee which was found alive on the col and carried down to the Rifugio on the hat of one of the party. Thence, in 10 min., they made the first ascent of the Cresta Gastaldi, the peak which lies between the Grand Paradis and the Pic de la Lune or Pointe de Ceresole. They then regained the Col de l'Abeille in 5 min., and in 56 min. more reached the Noaschetta glacier. They first crossed the hanging glacier (which they propose to name 'Glacier de l'Abeille'; it is marked No. 4, and called by the inappropriate name of Ghiacciaio del Gran Paradiso on Tavola XV. in Signor Baretti's 'Per Rupi e Ghiacci' (p. 48), so conspicuous in the view of the Grand Paradis from the Tresenta, diagonally from N.E. to S.W., then passing close by and to the right of its ice-fall, kept across rocks to the right till they reached a large snow couloir, down which they scampered merrily to the Noaschetta glacier. In 23 min. they reached the Col du Grand Paradis, and the Rifugio Vittorio Emmanuele in 45 min. more.

This is an extremely interesting expedition, apparently only possible in exceptional seasons. This year the snow was everywhere excellent; probably in most years the great couloir is a sheet of ice. The Grand Paradis was ascended from the Col du Grand Paradis on August 21, 1875, by Signori Vaccarone and Gramaglia.* Their line of ascent lay far to the W. of, and did not in any point touch the route of the Col de l'Abeille. The name Cresta Gastaldi was given to the point 3,850 by Signor Baretti in 1874;† it does not appear on

* *Bollettino del C. A. I.*, 1876, pp. 175–6.

† See Professor Baretti's *Per Rupi e Ghiacci*, pp. 67–8. He named the Cresta Gastaldi in honour of the famous Italian geologist, and estimates its height at 3,850 mètres. On page 62 he discusses the question of crossing the pass, which he considers possible, though very difficult, because of a wall of

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the Italian map, but will be found on Mr. Yeld's map in *Alpine Journal*, vol. xii. p. 509.

Becca di Noaschetta (3,447 mètres = 11,310 feet, New Italian Survey). Col de Valnontey (*circa* 3,535 mètres = 11,596 feet, New Italian Survey). Tête de Valnontey (3,543 mètres = 11,625 feet, New Italian Survey). Col de la Lune (*circa* 3,400 mètres = 11,155 feet). *August* 13.—The same party, starting from the Rifugio, crossed the Col du Grand Paradis, and having traversed the Noaschetta glacier in an easterly direction, made, by the easy rocky south-west ridge, the first ascent of the point marked 3,447 mètres on the New Italian Map, for which the name Becca di Noaschetta seems fittting, in three hours' walking from the Rifugio (45 minutes from the glacier). The Becca lies between the Tête de la Tribulation and the Lago di Goj at the eastern end of the Noaschetta glacier, and is seen from Cogne over the main ridge. It commands perhaps the finest view of the Grand Paradis that can be obtained.

Thence, in 30 minutes, by a traverse above the Ghiacciaio di Gay (G. Grandcrou S. of Mr. Yeld's map) and a snow couloir, they reached the col (leading over to the Plan de la Tribulation) between the Tête de la Tribulation and the point marked 3,543 mètres on the New Italian Map. In five minutes more they reached the point itself. This point, of which this was the first ascent, stands right at the end of the Valnontey, so that 'Tête de Valnontey' would appear to be a suitable name for it, while the col may be called 'Col de Valnontey.' The view from the Tête was satisfactory, Cogne being seen to great advantage.

They then, crossing the col and a bergschrund, descended towards the Plan de la Tribulation, rounded the Tête de la Tribulation (3,642 mètres), and reached the opening between the last-named peak and the Pic de la Lune, or Pointe de Ceresole (30 minutes from the Tête de Valnontey). Probably in most years the slope under the Col de Valnontey on the north side is ice; this year it was good snow. From the col, which they named Col de la Lune, Mr. Coolidge and the Almers made the ascent of the Pic de la Lune by the east ridge and north face (45 min. up, 25 min. down). The whole party then descended the steep rock-wall (which had been studied on the way up the Becca di Noaschetta) to the Noaschetta glacier in 35 minutes; the last bit by a snow couloir to the right. Thence, in 1 hr. 55 mins., they regained the Rifugio by way of the Col du Grand Paradis.

This and the previous day's work complete the exploration of the range on the south side of the Plan de la Tribulation, as the Tête de la

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rocks, for which reason it is a 'colle rompicollo.' In the *Bollettino* (numbers 10–11, pages 328–9) he discusses the Col de l'Abeille, and the ascent of the Paradis from it, deciding that both are possible if the lower rocks can be forced. It was precisely through those rocks that the 1888 party was led by the snow couloir. It is possible, however, that *both* these passages refer mainly to the Colle Chamonin (crossed by Signor Baretti himself on August 31, 1874), his map in the *Bollettino* (Nos. 10–11) not marking the Cresta Gastaldi, and indicating only one col (a possible one) between the Grand Paradis and the Punta di Ceresole.

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Tribulation was ascended by Messrs. Coolidge and Yeld, August 11, 1885 *; the Pic de la Lune by Signor Martelli, from the Noaschetta side, July 1, 1874, by Signor Baretti from the south-east, July 5, 1874,† and from near the Cogne side of the Col Chamonin by Mr. Yeld on August 5, 1879 ‡ (Mr. Coolidge's ascent was made by a variation of this last route); while the Col Chamonin (3,720 mètres in height, and lying between the Pic de la Lune and the Cresta Gastaldi) was crossed by Signor Baretti August 31, 1874.§ Excellent views of both sides of this range are given in Signor Baretti's book (Tavole XIV. and XV.), taken in each case from drawings by Signor G. B. Rimini.

Becca di Monciair (3,544 mètres = 11,628 feet, New Italian Survey). *August* 15.—The same party, with the addition of Joseph Jantet, of Epinel, reached the Col de Monciair in 1 hr. 52 mins. walking from the Rifugio. Thence, in 35 minutes, they climbed the Becca di Monciair by its north-east ridge, returning to the col in 18 minutes. In 38 minutes they reached the Broglio glacier, which was quitted on the left bank in 15 minutes, and in 2 hrs. 40 mins. more gained the Albergo della Levanna (Stabilimento) at Ceresole Reale.

The first ascent of the Becca di Monciair would appear to have been made by Signor G. Frasca in 1881.‖ His card, with a portion of the 'Gazetta Piemontese' of July 12, 1881, was found on the top, as also the card of another party, Signori L. Nicolone and C. Poccardi, August 3, 1885. The pass was first crossed by Signor Frasca on August 8, 1880,¶ and by Messrs. G. P. Baker and Yeld on August 18, 1881,** when the name Col de Charforon was suggested, but as the pass appears to be known as Col de Monciair it seems better to retain that name.

Mont Herbetet (3,778 mètres=12,396 feet, New Italian Survey). *August* 10.—The Rev. W. A. B. Coolidge, with Christian and Rudolf Almer, made the third ascent of this fine peak. Starting from the more southerly of the two Cols de l'Herbetet, they climbed up along the N. arête in 1¾ hr. to the peak, being considerably delayed by the great quantity of fresh snow on the upper rocks. The return to the col took 1 hr. 10 mins.

The first ascent was made by Signor L. Barale on August 22, 1873,†† in 4¾ hrs. from the col (2½ down), by the route just described; the second by Messrs. G. P. Baker and G. Yeld on August 3, 1881, by way of the E. arête.‡‡

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* *Alpine Journal*, vol. xii. pp. 416, 514.

† *Per Rupi e Ghiacci*, pp. 49–55.

‡ *Alpine Journal*, vol. ix. p. 362; vol. xi. p. 15.

§ *Per Rupi e Ghiacci*, pp. 69–70. Signor Baretti, on p. 67, speaks of the descent from the Col de la Lune as consisting of 300 mètres of sheer rock precipices, and probably impossible.

‖ Signor Baretti expressly states that in 1867 he did not reach the summit of the Monciair. (*Bollettino del C. A. I.*, Nos. 10–11, p. 321.)

¶ *Bollettino del C. A. I.*, 1880, p. 666.

** *Alpine Journal*, vol. x. p. 356; vol. xi. p. 26.

†† *Bollettino del C. A. I.*, 1874, pp. 284–6.

‡‡ *Alpine Journal*, vol. x. p. 354; vol. xi. p. 20.

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CHARFORON FROM THE NORTH (3,640 mètres=11,943 feet, New Italian Survey). *August* 14.—The last-named party, having started from the Rifugio Vittorio Emmanuele at the foot of the Grand Paradis, crossed the Tresenta (3,609 mètres) from the Col du Grand Paradis to the Col de Mont Corvé (in 1 hr. 20 mins. from col to col), and thence made a new route up the Charforon by the N. arête. At first they kept along the W. side of the ridge, climbing steep but broken rocks to the summit of a great pinnacle (35 mins.), and then along the rocky E. edge, overhanging the Ceresole side, to the summit (33 mins.), no real difficulty being encountered. The descent was made in 53 mins. to the Col de Monciair or de Charforon, whence the Rifugio was regained in 53 mins. more. This seems to be the fifth ascent of the peak, and the fourth route up it.

Mont Blanc District.

AIGUILLE DE BIONNASSAY BY THE EASTERN ARÊTE (4,061 mètres = 13,324 feet). *August* 13.— Miss Katharine Richardson, with Emile Rey and Jean Baptiste Bich, left the Cantine de la Visaille (at the foot of the southern Glacier de Miage) at 12.15 A.M., and followed the route of the Col de Miage to the junction of the two branches of the southern Miage glacier. Then, turning to the right, they passed the icefall and gained the southern arête of the Aiguille de Bionnassay (20 minutes above the Col de Miage) by a short snow-slope and easy rocks. They followed this ridge to the summit of the Aiguille, which was reached at 10 A.M., much step-cutting being required. Starting again at 10.15 A.M. the party traversed the eastern arête of the Aiguille in its entire length to the Dôme du Goûter, which was attained at 1.20 P.M., a halt of forty-five minutes having been made on the final slope. This arête, though with little exception a mere knife-edge, was in excellent condition, about 300 feet only—soon after leaving the summit of the Aiguille—being of ice. Chamonix was reached by the usual route at 6.40 P.M., the actual time walking from the Cantine having been 16 hrs. 10 mins.*

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* [This seems to be the fourth recorded ascent of the Aiguille de Bionnassay, the eastern arête of which had hitherto defied all attempts. The first ascent of the Aiguille was made on July 28, 1865, by Messrs. E. N. Buxton, F. C. Grove, and R. J. S. Macdonald (*Alpine Journal*, vol. ii. 132, 321–332), by way of the Glacier de Bionnassay and the western arête, the descent being effected by the S.W. face to the northern Miage glacier. The second was made on July 31, 1885, by M. Paul Vignon, from the southern Miage glacier, by way of a great ice-fall and the S.E. flank of the peak. (*Annuaire du Club Alpin Français*, vol. xii. [1885], pp. 80–83.) The third was made on July 13 or 14, 1888, by Signor G. Gruber (the Austrian Consul at Genoa), with Kaspar Maurer and Andreas Jaun, the route taken being by the southern Miage glacier, the S. arête (that leading up from the Col de Miage), and the S.E. face of the peak. It is well known that from 1856 onwards several early explorers desired to reach the summit of Mont Blanc direct from the Col de Miage. (See specially *Peaks, Passes, and Glaciers*, First Series, pp. 64–7, 74, and M. Durier's book on *Mont Blanc*, second edition, pp. 310–12.) As yet no one party has achieved this feat in a single day. Messrs. Reilly and Birkbeck, on August 6, 1864 (*Alpine Journal*, vol. i. p. 375; vol. ii. pp. 110–113), succeeded in passing from the Col to the Dôme in five

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MONT BLANC DIRECT FROM THE COL DU GÉANT. *August* 29.—Messrs. F. A. Bowlby and J. Stafford Anderson, with Abraham Imseng and Hans Almer, started from the hut on the Col du Géant at 4.50 A.M., but instead of making the long round by the Mont Blanc du Tacul, struck due W., and at 6.30 reached the S.W. corner of the Glacier du Géant to the S.W. of the Capucin (3,831 mètres). They then worked up a couloir, partly snow, partly rock, to the crest of the N.E. spur of the Mont Maudit, which was gained at 10.30, and where the usual route was rejoined. After cutting across the N.W. face of the peak they gained the foot of the Mur de la Côte at 5.10, and Mont Blanc at 7 P.M., reaching the Grands Mulets at 9.50 P.M. The route was unusually long and trying, but the only serious difficulty was found in getting up to the ridge of the Mont Maudit. The party took 4 hrs. (including a halt for breakfast) from the foot of the couloir to the ridge. One bit of rock-work about the length of the rope delayed them nearly an hour.

This new route saves the very long round which is usually made when ascending Mont Blanc from the Col du Géant.

AIGUILLE DE LANEUVAZ (3,730 mètres = 12,238 feet). *August* 11. AIGUILLES ROUGES (3,665 mètres = 12,025 feet). *August* 12. COL DE LA GRANDE LUIS (3,440 mètres = 11,287 feet).—MM. A. Barbey and L. Kurz (both members of the Swiss Alpine Club), with the guides J. Pessart, of Bagne, and J. Simond, of Chamonix, accomplished the first ascent of these peaks, starting in each case from a bivouac (2,648 mètres) on the Glacier d'Argentière. The former peak rises between the Tour Noir (3,843 mètres) and the Col du Tour Noir. The ascent of the latter point, lying between the Tour

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hours, skirting round the eastern flank of the Aiguille de Bionnassay and striking the great ridge between the Aiguille and the Dôme at about its central point. M. Vignon, on July 31, 1885 (*loc. cit.* p. 85), descended from the Aiguille to the glacier to the E., and thence in 2½ hours gained the Dôme by Mr. Reilly's route. The direct route *over* the Aiguille, down the east arête, and along the *entire* ridge between the Aiguille and the Dôme had not been taken until Miss Richardson's remarkable expedition last summer. Mr. Grove and party considered the E. arête of the Aiguille to be impossible. (*Alpine Journal*, vol. ii. p. 329.) M. Vignon (*loc. cit.* p. 73) states that a hunter, Edward Rosset (in 1874 ?), starting from the Dôme, traversed the ridge, but was stopped high up on the E. ridge by impracticable rocks. M. Vignon himself attempted to descend by it, but encountered such serious difficulties that he was forced to retreat after having accomplished 200 (656 feet) out of the 600 mètres (1,949 feet) which separate the summit of the Aiguille from the lowest point of the ridge between the Aiguille and the Dôme. M. Vignon calculates that his furthest point was about halfway between the summit and the rocks which stopped Rosset (*loc. cit.* pp. 84–5).

It has been reserved for a lady to accomplish the traverse of an arête which had hitherto been found impracticable, and to prove that it is possible to pass from a point on the S. ridge of the Aiguille de Bionnassay (only 20 mins. above the Col de Miage) over the summit of the peak straight along to the Dôme. Thus a splendid high-level (or, rather, mid-aërial) route, practically from the Col to the Dôme, has been opened up, which has long been aimed at, though it is improbable that (as the early explorers hoped) this will be generally adopted as a short and easy route up Mont Blanc from the western or S. Gervais side.

EDITOR.]

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Noir and the Mont Dolent (3,830 mètres), was extremely difficult. The party left their tent at 5 A.M., but did not gain the summit till 2.30 P.M., returning to their tent by moonlight at 11 P.M.* The same party also made the first passage of the lofty Col de la Grande Luis, between the peak of the same name and the Darrei, reported to be the shortest way from Argentière to La Folly. †

Monte Rosa District.

GRABENHORN (3,375 mètres=11,073 feet). *July* 7.—Mr. H. Heldmann, with Augustin Gentinetta and Cæsar Knubel, starting from Randa at 3 A.M., passed by the upper Festi sleeping-place at 6, and followed the Festi glacier to the N. foot of the peak, the summit of which was gained at 10 A.M. by means of the rotten rocky ridge which comes down furthest to the glacier. No trace of a previous ascent was found, but it is believed that the peak has been reached before, though this is the first recorded ascent. The party descended by the S. face (many loose rocks) to the Kien glacier, where the Täschhorn route was joined and followed to Randa, reached at 1.30 P.M.

LEITERSPITZ (3,218 mètres = 10,558 feet). *July* 9.—The same party made the first ascent of this peak, which forms the western extremity of the great western arête of the Täschhorn. The route taken was by the Täsch Alp, and then straight to the top by a gully filled with loose stones and by some smooth slabs of rock. Zermatt was left at 2.30 A.M., and the summit reached at 8 A.M.

OBER GABELJOCH. *July* 14.—The same party made the first passage of this col, which lies between the highest and central peaks of the Gabelhorn. Starting from Zermatt at 2.30 A.M. they gained the Arben glacier at 5, and in two hours more the foot of the rocks, which proved to be loose and rotten. Climbing over them and (for half an hour) up a snow couloir to the right, the party cut through a corniche and gained the col at 9 A.M. The return to Zermatt was made *viâ* the Trift glacier, the village being reached at noon.

BREITHORN BY THE N.W. ARÊTE (4,171 mètres = 13,685 feet). *July* 27.—Mr. G. W. Prothero and Gabriel Taugwalder, of Zermatt, left the Riffelalp Hôtel, at 5.10 A.M., to ascend the Breithorn by the N.W. arête. Crossing the Gorner glacier and keeping to the right (N.W.) of the Triftje, they ascended by a snow ridge to the left (S.E.) of the ice-fall of the Klein Matterhorn glacier, towards a V-shaped patch of rocks, easily visible from below, the apex of the V being uppermost. They halted on the lower rocks for half an hour, and keeping always to the arête, reached, at 12.30, the shoulder marked 3,688 on the Federal map. The rocks are quite easy, but the ridge is very steep, and in one part required a good deal of step-cutting. They halted for half an hour on the shoulder; then crossing the hollow snowfield beyond the shoulder in a southerly direction, they reached the col between the Breithorn and the Klein Matterhorn at 1 P.M., and keeping thence to the left along the ridge, they joined the ordinary route from

* *Schweizer Alpen-Zeitung*, 1888, pp. 199-200.
† *Echo des Alpes*, 1888, No. 3, p. 210.

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the Théodule about ten minutes below the summit, which they reached at 1.55. The route is a pretty direct one, and quite safe. It might be possible to ascend straight to the top from the shoulder, but here there would probably be danger from falling stones or glacier. The time taken was longer than it ought to be, partly owing to the quantity of step-cutting necessary on this occasion, partly owing to the fact that one of the party was out of condition. It is a more interesting route than the ordinary one, and safer than that by the N. arête. It lies to the S.E. of the way up to the Klein Matterhorn Pass, described on p. 65 of Mr. Conway's 'Zermatt Pocket-Book.'

Süd Lenzspitze from Süd Lenzjoch (4,300 mètres=14,108 feet). *July* 28.—Mr. R. F. Ball, with Ambrose Supersax and Louis Zurbrucken, left the Festi hut at 1.30 A.M., and, after sheltering from a snowstorm on the rock-ridge between the Festi and Hohberg glaciers for 2 hrs. 20 mins., reached the ridge connecting the Süd Lenzspitze and the Dom at a point a short distance to the N. of the Süd Lenzjoch (the so-called 'Nadeljoch') at 8.20 A.M. From this point the summit of the Süd Lenzspitze was reached in 1 hr. 25 mins., the route being at first along a sharp arête of rotten rocks, and afterwards up a couloir on the W. side of the ridge. The summit was left at 11 A.M., and, after a short advance along the arête leading to the Nadelhorn, a couloir was descended on to steep snow-slopes, by which the Hohberg glacier was regained in 1 hr. from the summit. The party then returned to the hut, and reached Randa at 3.50 P.M.

Lepontine Alps.

Ofenhorn, or Punta d'Arbola, by the S.W. Arête (3,242 mètres = 10,637 feet, Siegfried map; 3,237 mètres = 10,621 feet, New Italian survey). *July* 6.—The Rev. W. A. B. Coolidge, with young Christian Almer, having started from the comfortable little inn at Binn, followed the usual route up the Ofenhorn, by way of the Albrun Pass path and the hollow called Eggerofen, as far as the notch in the S.W. arête of the peak, which overlooks a nameless glacier. This notch, which was first crossed by Herr Gottlieb Studer, on August 8, 1864,* may be called Passo del Ghiacciaio d'Arbola. The usual route descends to the glacier due S. of the peak (which might well be named Ghiacciaio d'Arbola), and mounts by the snow slopes on the S. direct to the highest peak. The above party, however, having no local knowledge and finding the Arbola glacier enveloped in mist, preferred to attempt the ascent by the S.W. arête of the peak, which Herr Studer looked at but passed by. The climb along this ridge, composed of rotten rocks, was not difficult, save through the great amount of snow which lay on them. In 1 hr. 10 min. (slow going) they reached the S.W. end of the summit ridge, just where the two ridges enclosing the Eggerofen come together. A rather long and sharp snow-ridge, with rocky pinnacles here and there, led, in twenty-five minutes more (1 hr. 35 min. from the Passo del Ghiacciaio d'Arbola), to the more westerly of the two points which

* *Jahrbuch des S. A. C.*, ii. 217-8.

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form the highest peak of the Ofenhorn. Mist greatly exaggerated the distance of the W. from the E. (and slightly higher) peak, and this reason, as well as very stormy weather and apparent want of time, prevented the party from going on to the E. peak. In 15 min. they regained the S.W. end of the summit ridge, and in about 20 min. more they gained a point, rather above the pass, whence a glissade down snow took them down to the little glacier which fills the upper end of the Eggerofen.

On July 12 the same party made, in clear weather, the ascent of the E. peak, from the inn at Tosa Falls, by the usual route over the Neufelgiu Pass, the Hohsand glacier, the E. face, and the N.E. ridge. In 5 min. they descended to the snowy depression between the E. and W. peaks, and remounted to the W. peak, on which they found their old tracks of July 6. The return to the E. peak was made in 3 min., Tosa Falls being regained by the Bocchetta del Gallo. The S.W. end of the summit ridge is a good bit lower than the two points at its N.E. end, of which the E. point is distinctly, though not by much, the loftier.

It is believed that the peak has not been previously ascended by the S.W. arête. At any rate there seems no record of any such ascent in Alpine literature, and the route was unknown to the local guide at Binn.

As some confusion has arisen respecting the passes on the south side of the Ofenhorn, the following particulars may be acceptable. There are three such passes.

(1) *Gap leading over the S.W. arête of the peak from the Eggerofen (W. of the Albrun path) to the nameless glacier (now called Arbola glacier) S. of the peak.* It was crossed from W. to E. by Herr Studer in 1864, and from E. to W. by Mr. Cust on September 7, 1880,* while it was reached from the W. by Mr. Coolidge on July 6, 1888. It might be called *Passo del Ghiacciaio d'Arbola.*

(2) *Gap leading from the Arbola glacier to the Forno glacier.* This was reached from the W. by Herr Studer in 1864, and crossed from E. to W. on September 7, 1880, by Mr. Cust, who gave it the name of *Ofenjoch.**

(3) *Gap leading from the Forno glacier to the head of the Val Devero.* This was reached from the N., in 1879, by Mr. Cust, who has christened it *Passo del Forno,** and who in 1881 reached it from the S. side, thus completing the passage.

Siedel Rothhorn (3,296 mètres = 10,814 feet, Siegfried map; 3,284 mètres=10,775 feet, New Italian Survey). *July* 14.—The same party, starting from the inn at Tosa Falls, climbed the Blindenhorn (3,382 mètres) by way of the Gemsland hut and the Siedel Rothhorn glacier, and on the way back ascended the Siedel Rothhorn from the broad snow col between the Gries and Hohsand glaciers, first traversed by Mr. A. Cust on October 7, 1879.† The ascent up the easy S.W. arête took 20 mins., while the descent by the equally easy eastern arête

* *Alpine Journal*, vol. x. p. 98.
† *Ibid.*, vol. ix. p. 369.

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to the Gries glacier, and thence to the Gries Pass took 50 mins. from the summit of the peak.

'No cairn of any sort was found on the peak, nor does any previous ascent seem to be recorded in Alpine literature. Mr. A. Cust, however, informs me that he made the ascent in 1881 by way of the Siedel Rothhorn glacier and the S.W. arête, this no doubt being the first time the peak was climbed. Save the Blindenhorn, it is the loftiest peak to the south of the Rhone and Rhine valleys, between the Monte Leone, 3,565 mètres, and the Piz Valrhein, 3,398 mètres. W. A. B. C.'

Pizzo Rotondo (3,197 mètres = 10,489 feet). Mutten Pass (c. 2,920 mètres = 9,581 feet). *July* 17.—The same party, starting from the All' Acqua Hospice in the Val Bedretto, reached in 3 hrs., by forest, pasture, rocks, and snow, the broad snowy gap between the Kühbodenhorn (3,073 mètres) and the Pizzo Rotondo, marked Passo Rotondo on the Siegfried map.

A sudden break in the clouds enabled them to study the Pizzo Rotondo, and they left the knapsacks on a moraine at the W. foot about 20 mins. from the pass. From this point the S. and highest peak of the Rotondo was ascended in 1 hr. by way of its S. arête (gained by a snow couloir), and descended in 23 mins. by one of the great snow couloirs which seam its W. face; the ascent and descent of the last bit were made by the N. slope. No difficulties were encountered, despite the terrible reputation enjoyed by the peak, which is the culminating point of the S. Gothard district. A cairn was found, but no names or cards. From the Passo Rotondo, the party circled round the head of the Geren glacier, and remounted (in $1\frac{3}{4}$ hr. from the moraine near the Passo Rotondo) to the south-westernmost of the two snowy gaps in the ridge S.W. of the Leckihorn (3,069 mètres), the way being perfectly easy, despite bad weather and very soft snow. From this second pass (which it is proposed to name Mutten Pass) the party descended by gentle snow slopes down the Mutten Glacier, soon joining the route of the Lecki Pass, which was followed over the point 2,807 to the Furca inn (2 hrs. 50 mins. from second pass). The Pizzo Rotondo was first ascended on August 5, 1869, by Herr Victor Haller, from the E. side, by way of the Pesciora Glacier.* The N. peak was ascended from the W. by Herr Schläpfer, four days later, his guides only going on to the S. peak.† In 1871 the Pizzo was gained by Herr Coaz,‡ but the only other mentions of it in Alpine literature seem to be the references in the 'Cronaca del Club Alpino Italiano dal 1863 al 1888' (1888), page 92,§ to a successful ascent made by Signor Agostino Carones on July 29, 1885, and in 'S. A. C. Jahrbuch,' xxi. p. 582, to an unsuccessful attempt on August 15–16, 1885. The Mutten Pass seems to be new, and is a useful link in the direct route from Val Bedretto to the Furca.

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* *Jahrbuch des S. A. C.*, vol. vii. p. 531; *Itinerarium* for 1871, pp. 50–51.

† *Ibid.*, vol. vii. p. 166 *sqq.*

‡ Studer's *Ueber Eis und Schnee*, vol. iv. p. 363.

§ See, too, *Rivista Mensile del C. A. I.*, 1885, p. 347, from which it appears that Signor Carones went up by way of All' Acqua and the Passo Rotondo, and that he thought that the peak had never been climbed before.

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Bernese Oberland.

GROSS VIESCHERHORN BY THE N.W. ARÊTE (4,049 mètres = 13,285 feet); OCHSENHORN BY THE W. ARÊTE (3,905 mètres = 12,812 feet). *July* 22.—The Rev. W. A. B. Coolidge, with Christian Almer, jun., and his brother Rudolf, starting from the Concordia hut, followed the ordinary Mönchjoch route to the middle of the Ewigschneefeld, and then striking up the snow slopes to the N.E. (north of the great rocky spur of the Gross Viescherhorn), gained the main N.W. arête of the Gross Viescherhorn, slightly to the S.E. of the point marked 3,642 mètres on the Siegfried map (3 hrs. 10 mins. from the Concordia hut). They then followed the N.W. arête to the summit, keeping along the snowy edge so conspicuous from Grindelwald, a short steep ice-slope requiring steps to be cut up it, and taking to the rocks at the very end of the climb only. The cairn was gained in 2 hrs. 20 mins. from the point near 3,642. Descending for ½ hr. along the S.E. arête nearly as far as the Viescher Sattel (or gap between the Gross and Hinter Viescherhorn), the party went down easy rocks and snow to the great snowy basin to the N. lying between the Gross Viescherhorn and the Ochsenhorn, and forming the extreme head of the Viescher glacier. This basin was traversed to the W. foot of the Ochsenhorn (½ hr.), the party keeping a little way from the great corniche between the two peaks which forms such a feature in the view from Grindelwald. The Ochsenhorn was then ascended by its sharp snowy W. arête in 40 mins., the return taking 15 mins. The party then bearing to the left soon joined the Ochsenjoch route, descended to the main stream of the Viescher glacier, and returned to the hut over the Grünhornlücke. The whole round from the hut and back took 13 hrs. 5 mins., from which 2 hrs. must be deducted for halts, the actual walking being thus 11 hrs. 5 mins. On the whole the snow was in good condition, save in the afternoon.

The Gross Viescherhorn does not seem to have been previously climbed by the N.W. arête,* while it is believed that the W. ridge of the Ochsenhorn has been hitherto untouched, and the basin between the peaks unvisited. It would be a fine and not difficult or too long an expedition to go from the Bergli hut to the Concordia hut, viâ the

* *Alpine Journal*, vol. xiii. p. 380. I learn, just as this number is going to press, that on July 31, 1887, Mr. Hermann Woolley anticipated me in making the ascent by the N.W. arête. Mr. Woolley (whose guides were Christian Jössi and Johann Kaufmann, both of Grindelwald) informs me that his party left the Bergli hut at 4.35 A.M., crossed the Unter Mönchjoch, and reached the N.W. arête of the peak at the last depression before the N.W. arête rises abruptly. Thence, after a halt for breakfast, they struck up the arête, cutting steps up the ridge as far as the rocks, and gained the summit at 10.25 A.M., descending to the Eggischhorn by the usual route. I am of opinion that Mr. Woolley and myself reached the N.W. arête at precisely the same point, and of course the rest of the climb was the same in each case. I am much indebted to Mr. Woolley for supplying me with the above particulars. Mr. Woolley further informs me that with the same guides he succeeded, on July 28, 1887, in making the second ascent of the Schreckhorn from the Lauteraar Sattel. The party started from the Gleckstein hütte at 4.40 A.M., and gained the summit at 4 P.M. only, owing to the unfavourable state of the snow. They descended to the Schwarzegg hut by the usual route.—W. A. B. C.

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Gross Viescherhorn, traversing the entire N.W. or Mönchjoch arête, and descending either to the Ewigschneefeld or to the Viescher glacier. The Hinter Viescherhorn (4,020 mètres=13,190 feet),* too, might be easily taken on the way, thus combining the three peaks of the Grindelwald Viescherhörner in a single day.

Mr. Lorria's observations as to the actual summit of the Gross Viescherhorn being entirely in the Valais,† were found to be quite accurate, but the distance of the peak from the Bernese frontier is so short (far less than that between the Grenzgipfel and the Höchste Spitze of Monte Rosa) that the view from the cairn down on to the Eismeer is interfered with to the very slightest extent.

STRAHLEGGHORN (3,462 mètres=11,359 feet). *August* 14.—Mr. Felix O. Schuster, with Peter Baumann and Christian Bernet, and Major-General Blanckley, with two other guides, ascended this peak in about three-quarters of an hour from the Strahlegg Pass by way of the rocky arête leading up from the pass. It would probably have been easier to reach the summit by the north face, but the arête was chosen as affording a better climb. There was a good deal of snow on the mountain, and the ascent was not altogether easy, the arête being in some places very narrow and steep, while the rocks were by no means firm.

No account of any previous ascent seems to have been published, but on the summit a bottle was found containing the card of a Swiss climber who had effected the ascent in September 1887—it did not appear by what route. Unfortunately, the bottle containing the card was accidentally knocked down and lost. The view from the peak is magnificent, combining the special features of the panoramas from the Strahlegg Pass and the Finsteraarjoch.

The descent was effected on the S. side. The arête was followed for a short distance to about the point marked 3,382 on the Siegfried map. Then the party turned down the glacier in a S.W. direction till they reached the upper Eismeer, just below the ice-fall of the Finsteraarjoch.

'This expedition is a most enjoyable one, and I can strongly recommend it, especially as there is rather a scarcity of expeditions which can, like this, be accomplished up and down from Grindelwald in the day.—F. O. S.'

KLEIN SCHRECKHORN (3,497 mètres=11,474 feet). *July* 31, 1885.—Mr. F. O. Schuster, with Peter Baumann and Christian Bernet, ascended this peak by what is believed to be a new route, and one which is somewhat shorter than the ordinary one. Starting from the Schwarzegg hut, and having mounted the Nässifirn (very difficult in 1885 owing to scarcity of snow) for some distance, the party, instead of making for the main ridge and ascending by the S.E. arête, climbed pretty straight up the S. face of the mountain, striking the S. arête a short distance from the summit. The descent was effected entirely by the S. arête without touching the Nässi glacier.

METTENBERGJOCH (3,054 mètres = 10,020 feet). *August* 1880.—

* *Alpine Journal*, vol. xiii. pp. 379–380.
† *Ibid.* vol. xiii. pp. 381, 555.

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Mr. Felix O. Schuster crossed this pass with Peter Baumann. Having ascended the Gwächten (3,169 mètres=10,265 feet) from the Bäregg inn, they went down to the col between it and the Mettenberg, and effected a descent through the ice-fall of the Wechsel glacier (very steep and difficult) to the Ober Grindelwald glacier. The descent much resembled that of the final slope of the Wetterhorn, and the step-cutting, which was left to Mr. Schuster, as Baumann preferred to be last on the rope, was a by no means easy operation. About halfway down the glacier the party was forced to take to the rocks on the right; then went down the ice again, finally reaching the Ober Grindelwald glacier in 3½ hrs. from the col by means of easy rocks below the upper ice-fall. Crossing the glacier to the Schönbühl, they joined the Wetterhorn route, and returned by it to Grindelwald. Six hours were employed from the summit of the Gwächten to Grindelwald.

It would be better to take the expedition in the reverse direction, as in some years the ice-fall of the Wechsel glacier is probably not practicable. It is, however, one of the most interesting of the shorter glacier expeditions which can be made from Grindelwald.

The name 'Mettenbergjoch' was originally given by Dr. Emil Burckhardt to the pass (height, 3,159 mètres) between the Gwächten and the Klein Schreckhorn (later called Gwächtenjoch), which he effected on September 2, 1872. But, as he himself allows, this name more properly belongs to the pass between the Gwächten and the Mettenberg,* which is described above, and seems to have been crossed but once.

Fleckistock from the Meienthal (3,418 mètres = 11,214 feet). *September* 23.—Herr E. Huber, with Josef Gamma of Göschenen, having climbed this peak (formerly called Spitzliberg) from the west by the usual route from the Voralpthal in 7¼ hours from Göschenen, succeeded in forcing a way down the north side to the Meienthal, a route which was said to be impossible.† They followed at first the ridge falling north-east towards the point called Flecki, but were driven to the right, and finally, without any very great trouble, reached the Kartigelfirn. Wasen was gained at 4 P.M. by way of the Meienthal, the summit having been left at 10.45 A.M. and a long halt made on the Flecki.

Hühnerthalihorn (3,181 mètres = 10,435 feet). *September* 24.—The first ascent of this peak was made by Herren Charles Montandon and H. Kümmerli without guides. The ascent was made from the Handegg side by way of the Aerlen Alp and the Gruben glacier, the descent to the Hühnerthäli glacier and the Urbachthal. The climb is described as difficult and the view as very fine.

Bachlistock (3,274 mètres = 10,742 feet). *September* 27.—Monsieur Brémond and Pfarrer Baumgartner with Hans von Bergen and Johann Tännli, made the first ascent of this tower-like peak. The climb was made from the Bächlilimmi, and took 11 hours (?) from the Grimsel, in clouds and snowstorms. The descent was made without difficulty in 2½ hours to the Pavillon Dollfuss.

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* *Jahrbuch des S. A. C.*, vol. xxi. pp. 42–3.
† *Ibid.*, vol. ii. p. 39.

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ELWERRÜCK (3,386 mètres = 11,109 feet). *August* 9.—MM. E. Thury, A. Tschumi, S. Miney, and Paul Montandon, without guides, made the first ascent of this peak, without difficulty, from the Baltschiederjoch.*

Bernina District.

PIZ BERNINA BY THE BERNINA SCHARTE (4,052 mètres=13,295 feet). *July* 22.—Mr. Howard Knox, with Martin Schocher and Schnitzler, of Pontresina, left the Boval hut at 3 A.M., and at 7 reached the Fuorcla Prievlusa, or lowest point (3,452 mètres = 11,326 feet) of the ridge between the Piz Bernina and Piz Morteratsch. They then climbed along the narrow ridge to the south, finding the snow in bad condition and a huge corniche. At 11.30 they gained the summit of the Pizzo Bianco (3,998 mètres = 13,117 feet). They then continued to climb up and along the ridge between the P. Bianco and the Piz Bernina—this is the Bernina Scharte—finding considerable difficulties (especially one drop of 60 feet), and not gaining the summit of the Piz Bernina till 2.30.† The Bernina Scharte was forced for the first time by Dr. Güssfeldt on August 12, 1878; again by Dr. Schulz on August 6, 1883; and once more (this time *down*) by Dr. Güssfeldt on September 18, 1884.‡ In each case the Fuorcla Prievlusa was reached from the W. or Rosegthal side. Mr. Howard Knox reached it from the east, and his ascent by the Pizzo Bianco and Bernina Scharte is the first made by an Englishman.

MONTE ROSSO DI SCERSCEN (3,877 mètres = 11,720 feet). *July* 24.—Mr. Howard Knox and Herr Seebold, with Martin Schocher and Dangl, having ascended this peak from the Italian side, and being prevented from descending on the Roseg side by the bad state of the snow, forced their way along the E. ridge to very near the lowest point between the peak and the lower point of the Piz Bernina. Here they were compelled to spend the night, and next morning descended on the Italian side down the snow couloir between the Scerscen and the Bernina, a route not hitherto taken.§

PIZ MORTERATSCH BY THE SOUTHERN RIDGE (3,754 mètres = 12,317 feet). *August* 27.—Mr. C. C. Branch, with Martin Schocher, started from the Boval hut at 4.7 A.M., and skirted round the great E. buttress of the peak up a terrace, by which they gained in 1½ hr. the edge of the glacier in the gorge below Piz Prievlusa, parallel to the one leading up to the Fuorcla Prievlusa. A difficult descent of 40 feet down a bit of overhanging rock led them down on to the glacier, which they mounted to a band of black rock separating the glacier from the upper snow-field, which was gained by means of a dangerous gully between the ice and the rocks. After a long ascent up snow and

* The accounts of the four last expeditions are taken from the *Schweizer Alpenzeitung* of October 15, 1888, p. 211.

† *The St. Moritz Post and Davos News*, Summer issue, 1888, No. 9, pp. 149–150.

‡ See Dr. Güssfeldt's book, *In den Hochalpen*, pp. 122–140, 283–293; and *Oesterreichische Alpenzeitung*, 1884, pp. 173–7, 187–192.

§ *The St. Moritz Post and Davos News*, Summer issue, 1888, No. 10, p. 175.

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rocks the S. arête of the peak was gained, a little to the right of the lowest point, at 9.30 A.M. (This point had already been reached from the Roseg side by Messrs. Legh and Wainewright, on occasion of the first and only ascent of Piz Prievlusa—3,613 mètres—which seems to be accessible thence in about a quarter of an hour.) The party then started up the S. ridge of the peak, but, after a few hundred feet, were driven on to its eastern face, making one traverse after another over steep ice-slopes and smooth rotten slabs of rock, which all tended downwards rather than up, and became more and more difficult. Thunder and snow came on, so they forced a way straight up the rocks of the E. face to the snow on the crest, by which the top was gained at 2.30. The ascent took 10½ hrs., of which 1 hr. 25 mins. were devoted to halts. The return was made to the Boval hut by the usual route in 1 hr. 10 mins.*

Oetzthal District.

KLEINBERG-JÖCHL (3,200 mètres=10,500 feet). QUELLJOCH (*circa* 10,800 feet). *August* 8.—Mr. A. J. Butler, with Josef Spechtenhauser, starting at 5.15 A.M. from the village of Planail (1 hr. from Mals in the Etsch valley), mounted the valley, but in about 2 hrs., on reaching the foot of a steep 'kar,' which branches off to the east, the weather seemed so bad that they decided to attempt the passage of the ridge stretching south south-west from the Freibrunner Spitze, instead of, as they had originally intended, attempting to reach the Weisskugel along its W. ridge. Mounting the aforesaid 'kar' and the glen above it, they reached the small glacier at its head which is indicated without name on the Generalstabkarte, and is called Kleinberg glacier on the map issued by the German and Austrian Alpine Club. The weather now improving considerably, they crossed the glacier bearing nearly due east, and reached the pass at 9.45 A.M. By comparison with the Toberettajoch (*circa* 10,700 feet) and the Langgrubjoch (*circa* 10,000 feet), the height of the new pass may be estimated at about 10,500 feet, or 3,200 mètres, perhaps rather less. It is proposed to call it Kleinberg-Jöchl.

After descending on the other side for a short distance, the party bore to the N.E., crossing many rock-spurs dividing the gullies which characterise the upper Matscherthal, and enjoying a magnificent view of the Weisskugel and the Matscherferner. The level of the Matscherthal was gained at a point rather N. of W. of the great ice-fall. They then mounted over grass and rocks to the moraine, and crossed the upper part of the Matscherferner to the pass between the Innere and Aussere Quellspitzen, attained at 2.45 P.M. This has probably been crossed several times, but as it stands in want of a name, it is proposed to call it Quelljoch. The descent to the Steinschlagferner was very steep for a short time, perhaps 100 steps having to be cut. Kurzras in the Schnalserthal was reached at 4.45, and Unsere liebe Frau at 7, after a day of about twelve hours' actual walking.

The Planailthal is believed to have never been previously visited by

* *The St. Moritz Post and Davos News*, No. 22, pp. 489–490.

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a traveller, at all events since the Ordnance Survey was made. On August 7 Mr. Butler and his guide had made an excursion to the glacier at the head of the valley (4 hrs. from the village), which has a pretty ice-fall on the S. side, the N. being comparatively smooth.

SIMILAUNJOCH (*circa* 11,000 feet). *August* 9.—The same party, starting from Unsere liebe Frau at 7.30 A.M., went up the Schnalserthal to Ober Vernagt, then mounting by steep grass, *geröll*, and rocks about N.N.E. gained at 11.30 a point a little below the summit called Kaserer-wärterl (a subordinate peak of the Similaun). After a long and pleasant halt of two hours spent in lunching and enjoying the view from the Antelao to the Bernina, the party crossed the névé of the Grafferner, on a level, to the pass which lies between the Similaun (3,599 mètres) and the western Marzellspitze (3,538 mètres). The descent was at first very steep, quite 60°, but the snow was good, and the bergschrund well filled up, as also the crevasses on the usually formidable Marzellferner. The Sanmoarhütte was reached at 4.45. The pass must be, with perhaps the exception of the Hintereisjoch (3,458 mètres=11,346 feet), the highest over the watershed between the Inn and the Adige.

The pass was reached on August 6, 1883, for the first and only previous time by Herr Reitzenstein, of the Breslau section ot the German and Austrian Alpine Club, with Josef Spechtenhauser as guide. Great trouble was then found in traversing the lower bergschrund. The party climbed the Hintere Schwärze (3,625 mètres), and returned to the Schnalserthal without completing the descent to the Sanmoarhütte.*

Brenta District.

CIMA DEL RIFUGIO (8,700 feet). *September* 15.—Messrs. T. L. and C. H. Kesteven and A. H. Birch-Reynardson, with Bonifacio Nicolussi as guide, made the first ascent of the small peak near the Rifugio della Tosa, for which the name Cima del Rifugio is proposed. The south-west side of the mountain is traversed by a series of horizontal terraces, and the climb to the lower of the two peaks is made almost entirely by means of steep chimneys and cracks up the rocks between the terraces. Between the two summits there is a descent of about 40 feet. Almost opposite the small ridge between the two summits there is a gully, which appears to afford an easy way to the top; but this is blocked by a large boulder, and the ascent of the rocks at the side for a short way is rather difficult, there being very little hand or foot hold. From the top of the gully it is only a short scramble to the top. An aneroid which was set at the Rifugio gave the height as just 8,700 feet, or about 480 feet above the Rifugio. A small cairn which can be seen from the Rifugio was built on the summit. The time occupied in the ascent was 1½ hr., and in the descent 1 hr. 20 min., in each case without a halt. The peak affords a most interesting short climb, and, on account of its size and its proximity to the Rifugio, can be climbed on the same day as any of the peaks near the Bocca di Brenta.

* *Mittheilungen des D. u. Ö A. V.*, 1884, p. 59.

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Norway.

STORE STYGGEDALSTIND (7,580 feet) FROM MARADAL. *August* 3.—An English lady, with Thorgeir Sulheim and Anders Eide, ascended this peak from Vormelid, by the Maradalsbræ, and Maradalskar, between Gjertvastind (the easternmost peak of the Horungtinder) and Store Styggedalstind. The descent was made to the Gjertvasbræ, and afforded some good ice-work and very fine ice-scenery.

On August 14, the same party, without Anders, ascended the highest peak of the Soleitinder (6,630 feet) from Berdal.

STORE GJEITHORN.—On August 27 Messrs. C. and E. Hopkinson, with Lars Jansen of Olden, made the first ascent of the Store Gjeithorn (Söndmöre). From Skylstad in Norangsdal the first part of the route taken was the same as for the ascent of Slogen, but instead of turning to the left above the slopes, the side valley was followed until the outlying shoulder of the Gjeithorn (Amtskart) was passed. The glacier to the left then gave an easy route to the rocks. The bergschrund presented no difficulty, and 200 feet of sloping rock-slabs led to a col, from which there was 70 feet of difficult rock to the summit (about 5,050 Norsk feet): time 4½ hrs.

On September 28 the same party crossed from Urke to Brunstad (Sökelven). Instead of following the usual route, going north from Haukaasen sæter, they went east to Lange sæter, then up the left branch of the valley to the foot of the glacier, ascended the rocks immediately to the left of the icefall, thence over easy snow to the skar (3,600 feet), turned sharp to the left, and descended beside a frozen lake and grass slopes to Velle sæter (6 hrs.). The Amtskart is inaccurate for both these excursions.

ALPINE NOTES.

ANNUAL GENERAL MEETING AND DINNER.—The Annual General Meeting will be held on Tuesday, December 18, at the Club Rooms.

The Winter Dinner will take place at Willis's Rooms on Wednesday, December 19. The chair will be taken by Mr. C. T. Dent, President.

The usual Picture Exhibition will *not* be held this year.

All communications relating to the Winter Dinner, or to the business of the Club generally, should be addressed to F. O. Schuster, Esq., 50 Belsize Square, South Hampstead, N.W., Acting Hon. Secretary.

DISTRIBUTION OF THE AVALANCHE RELIEF FUND.—The following is the balance-sheet of the contributions sent in for the relief of the Italian highlanders who suffered so severely from avalanches last winter:

	Francs
1. Collected in Turin (including 2,000 francs from the Duke of Aosta, 1,000 from the Central Direction of the Italian A. C., and 400 from the Turin section)	12,060·05
2. Collected by sections of the Italian A. C. (save Turin) .	6,985·95
3. Collected by Foreign Alpine Clubs (including 7,627f. 15c. from the London A. C.)	8,069

Making a grand total of 27,115 francs, or 1,084*l.* 12*s.*

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The places to which the largest sums were apportioned were Valtorta (3,000 francs), Valprato (1,600), Ronco Canavese (710), Ponte di Legno and Arnaz (each 700), Gressoney (630).

An official document estimates the damage done by avalanches in Tyrol and the Vorarlberg during the winter of 1887–8 as follows: cattle killed, 510; buildings destroyed, 1,204; while 53 persons lost their lives. The total damage done is reckoned at 754,162 florins (75,400*l.*). A pamphlet by Herr Th. A. Bruhin, entitled 'Die Lawinennoth in der Schweiz im Jahre 1888' (Zürich, Cæsar Schmidt, price 1 franc), gives many details as to the harm done in Switzerland, where, up to May 1 last, a sum of 3,602 francs had been collected by the Bern and Chaux de Fonds sections of the Swiss Alpine Club for the relief of the sufferers.

Ladies in the Mountains.—The Queen of Italy has been for some years in the habit of staying for a short time at Courmayeur. Last summer during her sojourn there she made several mountain excursions, such as the Mont de la Saxe and the Cramont. Her chief expedition was to the Col du Géant. Having slept at the Mont Fréty inn on the night of August 16, her Majesty started the next morning at 4 A.M. accompanied by a retinue of twenty-seven persons, including two ladies of her court, Henri Séraphin being the chief guide of the party. The caravan reached the col at 10 A.M., but the weather became worse, and it commenced to snow, so that the party were forced to pass the night in the hut. It is stated that the Queen was much amused at this little adventure, but her ladies far less so. On the 18th the party, despite the bad weather, started downwards at 10.20, reached the Mont Fréty inn at 2.45, and returned to Courmayeur that night, the Queen displaying great courage and calmness, and being enthusiastically received on her return to her summer residence. So far as we are aware, this is the first occasion on which any European sovereign has visited the ice and snow regions, though Victor Emmanuel II. may have done so in the course of his hunting expeditions.

We have recorded above (page 150) the remarkable traverse of the Aiguille de Bionnassay by Miss Katharine Richardson on August 13 last. The same indefatigable lady achieved, on August 24, the ascent of the Meije in Dauphiné, this being the first time the summit has ever been reached by a lady. Leaving the La Bérarde inn at 9 P.M., accompanied by her two guides, J. B. Bich and P. Gaspard père, Miss Richardson was forced to wait two hours on the rocks for daylight, but nevertheless reached the summit at 7.30 A.M., and was back again at La Bérarde at 5 P.M. This is the first time the mountain has been taken from La Bérarde without sleeping out, and the ascent is by far the fastest on record. On August 29, the same lady with the same guides started from La Bérarde and crossed the Ecrins back again to La Bérarde, this, too, being the first time the peak has been done without sleeping out. The time actual walking from La Bérarde and back was 15hrs. 40min. on the Meije, and 16hrs. on the Ecrins. These three ascents are, perhaps, the most noteworthy events of the past season in the Alps.

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On August 16 the ascent of Mont Blanc was made by Miss Flossie Morse, a young lady of twelve or thirteen years of age, in either case the youngest person of either sex who has ever achieved the expedition. It will be remarked that the ascent was made in one day. The following letter appeared in the papers on this subject:

'Sanction was given under the following circumstances. The child had done for a considerable time a great deal of walking and climbing, and had shown remarkable powers of endurance. Mr. Evans, a gentleman who has now made his sixth or seventh ascent of Mont Blanc, felt convinced that she could reach the summit, and he alone took the responsibility. We left Chamonix soon after eight in the evening. At La Pierre Pointue Flossie Morse began climbing with us. At twelve we were roped. By the aid of lanterns we crossed the glaciers, and reached the Grands Mulets at half-past three A.M. Stayed there an hour only, and had eggs, coffee, &c. Started again, roped of course, at half-past four. The morning was magnificent. On arriving at the Grand Plateau we found a party returning, who had been trying to ascend by the Bosses du Dromadaire, but had found the wind too strong. We made the ascent by the Corridor, the Mur de la Côte, and the Petits Mulets, but even then we had to go somewhat out of the way, which made the ascent more than usually dangerous and trying. We reached the summit about three in the afternoon. I may here remark that Mr. Evans, during the whole of the last part of the ascent, kept asking Miss Morse whether she felt fatigued, and it was not till the summit was reached that she confessed to feeling tired. The worst part of the work—I mean the most fatiguing—now began, for during the next few hours our feet sank two feet in the snow at each step, and Miss Morse was at this time certainly very fatigued, but even then only had the assistance of a guide's arm. However, the Grands Mulets was reached about seven, and after a cup of tea Flossie Morse seemed quite to recover from her fatigue. A severe hailstorm now came on and lasted a long time, so that the guides considered the glacier too dangerous to cross. Consequently we slept at the Grands Mulets, and leaving there the next morning at ten reached Chamonix at two, Flossie Morse not seeming at all tired.'

Mount Saint Elias.—A party, consisting of Messrs. E. H. and H. W. Topham and Mr. George Broke, undertook a further exploration of Mount Saint Elias last summer, a task begun by Mr. H. W. Seton Karr in 1886 (see 'Alpine Journal,' xiii. 89, 177). The following interesting letter (dated Victoria, British Columbia, on September 17) from Mr. Broke to the Editor gives a rough preliminary sketch of what the party did and how they fared. 'We left here June 5, and waited a fortnight at Sitka for Mr. William Williams, an American member of the Alpine Club. We left there July 3 in a horrid little schooner, and got up to Yakutat on the 10th, which we left in three canoes on the 13th, and got to Icy Bay in one day, landing without any difficulty from surf. After some attempts on the bush we decided to follow the Schwatka route up the Jones River, the Indian name of which is Yahkh-tze-ta-heen (Muddy Harbour River).

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We reached the Chaix Hills in three days and sent the men back for more supplies. (We had four white packers and six Indians.) We turned the E. end of the hills (Libbey's route) and got to a plateau of about 2,000 feet, whence we had a superb view of the S.E. face, which we pronounced quite unclimbable. It was like the Dom from Saas, but just twice as high, with snow continually falling. So we faced about and went round the hills again, the men joining us and going back again, but we kept two white men (we always kept two Indians). A terrible misfortune happened to me. I broke my only pair of snow spectacles. I might perhaps have rigged up a makeshift, but I should have had to go so much more slowly being so terribly blind, that it would have been quite unfair to them, and had I got snow ophthalmia up there it would have been very serious; so I sorrowfully waited a week while they had two camps, whence on August 2 they ascended a slate shale arête to the rim of the crater which they rounded to a height of 11,000 feet, all they could do in a day. The climbing was much too difficult for any but trained porters, so that it was impossible to take up tents or blankets, and so to get higher. The next party must certainly take Swiss guides. We got back to Yakutat August 8. There was a tiny schooner on which Williams went down, as he had to be back in Boston. By the 23rd our schooner hadn't turned up (she is believed to be lost), and I determined to take my chances in an Indian canoe. I had a most enjoyable trip, and am the first white man who ever travelled down that coast in a canoe for pleasure. With light winds we took two days and a night to reach Cape Fairweather, where we camped one night, and I had a superb view of Fairweather, which is much more attainable than Elias, though the snow looked as bad, always either soft and granular, or else ice. Should I go up there I should certainly try it. Next day we had a fine wind and went right down to C. Spencer, passing the great Pacific glacier, which has a seafront of about one and a half mile. Though great pieces are continually breaking off, there are no bergs, as the surf pounds them up directly. I reached Sitka 7.30 P.M. the 30th. We had to stay four nights at C. Spencer, as a south-easter came on. It was not very cheerful, as the rain came through the tent, and our only diversion was spearing salmon, with which the little river was crammed. This was lucky, as our bacon had gone bad. From there we made C. Edwards next day, and then to Sitka. I was just in time to secure a small steamer, which would have left that night, and she went up to Yakutat next morning for the others, but they had not returned when I left on the 8th.'

Mr. H. W. Topham, in a letter written on September 18 from Sitka, Alaska, to the Editor, gives the following details of his expedition, of which we hope to publish a full account in an early number:—

'You will probably have heard already that my attempt on St. Elias has not been as successful as I had hoped it might be. Nevertheless, if what we have done this year be looked at from one point of view, namely, as an aid to future attempts, then, in that case, our success is more apparent. We reached the height of eleven thousand feet—perhaps a few hundred feet more—and this was upon what may be con-

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sidered as the mountain proper, and not upon an auxiliary range of hills. I believe that the mountain, as we found it, was not in a fit condition for climbing, and this was the main reason that we pushed no higher. The route we took is probably the only one available upon the southern sides of the peak, and it is very likely that there are a dozen comparatively easy routes on the northern slopes. Unfortunately, the peak is so difficult of approach that we were unable, when thwarted on the south, to attack it from the north. I took a camera with me, and hope that some of the negatives may develop, but I am doubtful. Several of us, however, took sketches, which are very accurate. The weather was magnificent the whole time; a most exceptional year, I believe. Perhaps, had the summer been less warm there would have been more snow and less ice. From the point we reached, I think that to attain the summit would have necessitated several thousand feet of step cutting. The mountain we judged to be about 19,000 feet. We returned to Yakatat on August 8, and were unable to get away till September 13, so we were rather tired of Yakatat.'

Mr. H. W. Seton Karr, in a letter to the Editor, dated June 23 last, also from Victoria, British Columbia, sends the following interesting and important notes on the exact position, topographical and political, of Mount Saint Elias, which in some points recalls a similar discussion as to Mont Blanc.

'It seems to me that it would not be out of place to state again at this juncture what I did not sufficiently press before the Royal Geographical Society, regarding what I conceived to be the true position of this splendid and geographically important mountain. It belongs to Great Britain, and not, as I believe, to the United States, and Messrs. Topham's expedition may, and I feel sure will, confirm my observations.

'As compared with our own experiences, I can realise most of the difficulties with which such an expedition is likely to meet—the second party which will ever have landed upon those enormous deserts of ice. The dangerous canoe journey along the rock-bound coast, and the Pacific surf offer great obstacles to the journey thither.

'Though the mountain has been called the highest in the United States or Canada, that is no reason why its position should have been slightly altered by the United States Coast Survey, and moved several miles to the west of the international boundary, which was declared to follow the 141st meridian from the watershed northwards. At the time of Vancouver's visit the Anglo-American treaty, delimitating the north-west territorial and British Columbian Alaskan frontier, was non-existent; he states in his travels that the length of time he had remained within sight of these two remarkable mountains, meaning Mounts Fairweather (15,500 feet) and St. Elias (19,500 feet), had afforded him many opportunities of estimating their height and for observations to ascertain their situation. That of the latter he gave as lat. 60° 22½′, and long. 219° 21′. Not only does Vancouver give this position for the great peak, but his observations are to within a few minutes corroborated by the other navigators.

Mount St. Elias, owing to its wonderful situation so close to the

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Pacific Ocean, its height and the gigantic extent of its glaciers, presents a more imposing appearance than, I believe, any single peak elsewhere to be found, whether in the Himalayas or Andes, and the scenery in the vicinity of Yakutat, or Yakatat, as it is sometimes spelt, is perhaps quite unique and without a rival of its kind in the world. Most photographs (Mr. Libbey's got damaged) would give a faint and unsatisfactory idea of the immense grandeur of the sight on a clear day. The atmosphere was usually unfavourable, even in the brightest weather, for distant views, and the distance is great. As a first step towards appropriating the highest peak—I don't say it was not done in good faith or on strict scientific principles—the present head of the Coast and Geodetic Survey at San Francisco (who is a most respected friend of mine) was lucky enough to discover, from the latest bearings taken at Yakutat, that the proper place for Mount St. Elias was exactly in lat. 60° 22′ 6″, and long. 140° 54′, or dreadfully close to the boundary line, which is, as stated above, on the 141st meridian of longitude W. from Greenwich; this being farther west than Vancouver's position by fifteen minutes, and farther south by twenty-four minutes. This *southing* helped to make St. Elias more American than ever, because the boundary, by the wording of the treaty, was to run parallel to the coast at a distance from it of ten leagues, except where the summit of the watershed came within that zone, in which case the watershed was to be the frontier. This position was therefore incorporated in the United States coast survey book, or Coast Pilot of Alaska. Before making another jump—and this time clear across the boundary—St. Elias waited for the next edition of the volume above named, a copy of which I do not at this moment possess. Several San Francisco papers lately stated these facts, but when I landed there in 1886, though they professed to be anxious for information, they asserted that any such claim of depriving the United States of their right to Mount St. Elias, made through their columns, would inflict an injury on their reputation and adversely affect their circulation.

'We may not have done adequate justice to the grand ranges which lie immediately in rear of the great peak, unless Mr. Schwatka has made up for this in our forthcoming joint article in the 'Century' magazine. This mass of mountains, which, owing to their distance when viewed from Yakutat (100 miles or less), resemble a dim agglomeration of cumulous clouds floating on a dazzling white sea of ice, vaguely discernible in mid air, with hardly a rock visible from base to summit, can only be described as truly indescribable. The midsummer months of June and July are generally deliciously fine along this coast, and have probably earned for it the name, from the old whalers, Fair-weather Ground. A pity the mail steamers do not run to Yakutat (two days from Sitka). The recent rumours of there being gold-bearing black sand east of the Indian village has attracted a number of miners to Yakutat this summer.

'The world offers no similar field for the study of Brobdingnagian glacial phenomena. Muir's glacier in Glacier Bay, the largest one seen during the usual round of the Inland Passage, hardly compares with

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these. The glacier I named Bering's Great Glacier, behind Cape Suckling, seemed to me the largest on the coast. Those we called after Professors Guyot and Agassiz are likewise enormous, and the whole system together forms a province of glacial ice measuring hundreds of miles in length and thousands of square miles in extent. I can hardly venture to estimate to within ten thousand square miles how many, but with this proviso, the area of the whole might be called not less than forty thousand square miles of ice, averaging, say, 300 feet in thickness at least, and this in a latitude lower than that of the Shetland Islands. This is exclusive of other Alaskan ranges, and refers only to the country between Chilcat and the Copper River. Our great Agassiz glacier is the Malaspina Plateau of the Coast Survey, who never entered Icy Bay. They thought it a subterranean collection of ice, and it is to a certain extent buried by the moraines which intersect and cover it, particularly near its outer fringe.'

THE CASCADE MOUNTAINS.—The Rev. W. S. Green has returned from a successful journey in the Cascade Mountains. Making the 'Glacier Hôtel' on the Canadian Pacific Line his headquarters, he made many glacier expeditions, and some fine ascents, and mapped the neighbouring ranges. The difficulties of transport proved very great, and some of the peaks very hard climbs. Mr. Green will give a report of the results of his explorations early next year to the Royal Geographical Society, the Council of which made a substantial contribution to the expedition, and supplied the necessary instruments for his observations.

THE TWENTY-FIFTH BIRTHDAYS OF THE SWISS AND ITALIAN ALPINE CLUBS.—The two oldest of the Alpine Clubs on the Continent have this year celebrated the twenty-fifth anniversary of their birth, and as both acknowledge themselves to be the offspring of our own Club, our readers may be interested in having some details of these festivals set before them.

The Swiss Club was founded on April 19, 1863, at Olten, and it was in that place that several members of the Club met together to celebrate its twenty-fifth birthday by a banquet, which seems to have been very successful and interesting. Among those present we note the names of Professor Ulrich, Herr von Fellenberg, Herr A. Raillard, and Herr A. Hoffmann Burckhardt. Another banquet, with a similar object, took place the same day at Bern, and was attended by fifty-two members of the Bernese section. We regret to learn that the veteran Herr Gottlieb Studer, who has done so much for mountaineers, both with ice-axe and pen, was unable to be present owing to illness. On April 17 another banquet took place at Basel, sixty-three members and their guests being present. It is stated that of the thirty-five founders of the Club, eleven are still living.

The Italian Club was founded on October 23, 1863, and, as might be expected, the festivities in honour of the anniversary have been very brilliant and well attended, the Duke of Aosta (as representative of the King, who is the honorary President of the Club) honouring the proceedings with his presence. The fêtes took place at Turin on June 28 and 29, a little before the exact anniversary. Besides the

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opening of a permanent exhibition of the smaller Alpine industries, and of the new room for the scientific Alpine collections of the Club in the Stazione Sezionale on the Monte dei Cappuccini, and the presentation of a gold medal to Signor Vaccarone, in recognition of his remarkable and numerous publications on Alpine matters, a great banquet gathered together 200 guests, and a commemorative marble tablet in the Castello del Valentino, the original home of the Club, was publicly unveiled.

On June 30 over sixty members went up to Crissolo, at the head of the valley of the Po, where another banquet took place; and many of these went over the Passo delle Sagnette to the Sacripante Club hut (now called the Sella hut) at the foot of Monte Viso, where they dined and watched a party of six, including two of the Sella family, making the ascent with great difficulty and danger, because of the vast quantity of snow on the rocks.

It will be remembered that Signor Quintino Sella's ascent (the third) of Monte Viso, on August 12, 1863, was the immediate occasion of the foundation of the Italian Alpine Club. In a letter written to Professor Gastaldi three days later, he proposes such a Club on the model of the London Club, and expressly states that it was Mr. W. Mathews's vivid account of the first ascent of the Viso, on August 30, 1861 (printed in 'Peaks, Passes, and Glaciers,' second series, vol. ii.), which suggested his ascent of 1863.

The Alpine Club may well feel that it has a share in these twenty-fifth anniversary festivals of its two eldest offspring, which have grown so fast and have become such influential institutions.

Death of Old Peter Taugwalder.—This old guide died on July 11 last, of syncope, at the Schwarzsee inn, near Zermatt. He was 68 years of age, and had lived for many years in America. He will be remembered as one of the two guides who, with Mr. Whymper, escaped from death on occasion of the terrible accident of July 14, 1865, on the Matterhorn. As the rumour that he cut the rope on that occasion springs up from time to time, it may be well to repeat Mr. Whymper's emphatic declaration on the point *:—'Old Peter Taugwalder is a man who is labouring under an unjust accusation. Notwithstanding repeated denials, even his comrades and neighbours at Zermatt persist in asserting or insinuating that he *cut* the rope which led from him to Lord F. Douglas. In regard to this infamous charge, I say that he *could* not do so at the moment of the slip, and that the end of the rope in my possession shows that he did not do so beforehand.'

The Lake District. *July* 14.—Messrs. Edward Hopkinson, W. P. Haskett-Smith, Geoffrey Hastings and I ascended Dow Crags by the steep gully directly above the foot of Goat's Water. There were three difficult rock pitches to surmount, the lowest, which is about 30 feet high, having defeated all former climbers; 1 hr. 30 mins. of very good climbing were met with. A stone dropped down from a rock near the top of the gully takes over 5½ sec. before touching the bottom. One

* *Scrambles amongst the Alps*, p. 404; *The Ascent of the Matterhorn*, p. 294.

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of the party was subsequently lowered down a vertical gully further west by a rope 120 feet in length.

July 15.—The same party ascended the Deep Ghyll Pillar on Sca Fell from The Rake's Progress. They entered the mouth of Steep Ghyll, and, after climbing to the foot of the great pitch, they turned to the right and soon reached a long narrow rock, parallel to the face of the Pillar, but separated from it by a deep and narrow crevice. Above this, a steep slab led the party to the foot of a nearly perpendicular chimney, which was only 18 inches wide. One of the party stood upon the shoulders of two of the others, and then wriggled up the chimney. After 110 feet of rope had been paid out to him, he found a secure place, where he sat down and drew in the rope whilst the others came up, one by one. Then, after passing along an interesting arête well known to both Messrs. Haskett-Smith and Hopkinson, the top of the pinnacle was reached. The party had enjoyed 3¼ hrs. of first-rate rock-climbing. Mr. Haskett-Smith had previously climbed this pinnacle from the upper portion of Steep Ghyll, after making a most brilliant ascent of the Ghyll itself, and Messrs. Hopkinson had tried to descend from the pinnacle to Deep Ghyll, but had failed.

W. Cecil Slingsby.

Is the Summit of Mont Blanc in France or in Italy?—Monsieur C. Durier's discussion of this interesting politico-topographical point in his classical book on Mont Blanc (second edition, pp. 24–26) has commonly been held to have decided the question in favour of France. Signor Enrico Abbate (the secretary of the Roman section of the Italian Alpine Club) has lately, however, published ('Rivista Mensile del C. A. I.,' 1888, pp. 165–171) a criticism of his statements. Passing over minor points, we find that the two writers are directly at issue as to the evidence afforded by a certain map. Here are M. Durier's words:

'Enfin, si l'on consulte la carte jointe sous le numéro 3 à la convention de délimitation entre la France et la Sardaigne signée à Turin le 7 mars 1861, on remarquera que la frontière, au lieu de suivre la courbe des crêtes, est tracée par une ligne brisée. Cette ligne se dirige d'un point saillant de l'arête nord-ouest sur l'espèce d'avant-toit que forme l'extrémité ouest du dos d'âne de la cime, et de là, directement sur le Mont Blanc de Courmayeur; de sorte que, au lieu de partager la cime en deux dans le sens de sa longueur, elle en vient seulement frapper le bord pour se continuer dans une direction oblique.'

Signor Abbate has consulted the original map, which is attached to 'procès-verbal' No. 2 of the Boundary Commission (appointed under the treaty of March 7, 1861), dated Turin, September 26, 1862. On it the summit of Mont Blanc is (like all other peaks) marked by a red ring. Now the red line marking the boundary runs from the west *through* this ring, and then bends to the S.E. to take in a bit on the Sardinian side of the peak, rejoining the true watershed rather farther to the east. This deviation of the boundary line to the south appears in the MS. map drawn in 1823 by Lieutenant Muletti, of the Sardinian Ordnance Survey; but the mistake does not appear

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on the engraved sheet published in 1834, or in the new edition corrected on the spot in 1854-6. But this divergence between the MS. and engraved maps does not affect the point at issue, for in both the boundary line passes *through* the highest point of Mont Blanc. As this 'procès-verbal' expressly states that the boundary was to follow the ancient frontier line between Savoy and Piedmont along the main chain of the Alps, Signor Abbate concludes that the real evidence is in favour of the top of Mont Blanc being on the exact boundary, and belonging, therefore, half to France and half to Italy. He is forced to allow that the six-sheet reduction (scale 1/250,000) of the Piedmontese map (scale 1/50,000), officially published, shows the frontier line drawn round to the south of the summit; but he maintains stoutly that this is a mere slip, as is shown by the Monte Bianco sheet (published 1886) of the new Italian survey (1/100,000), which represents the boundary line as passing over the summit.

It may be noted that Mieulet's map (1865) shows the frontier line as passing over the summit of Mont Blanc de Courmayeur, thus making the highest dome of Mont Blanc to be entirely in France. Mr. Reilly's map does not mark any political frontier line at all.

RAISED PLANS OF THE ALPS.—Whilst in Rome this summer I saw a very creditable plan, in plaster, of the Graian and Pennine Alps *du Diocèse d'Aoste*. The relief was being exhibited in the Vatican amongst the Pope's Jubilee presents. The *planimétrique* of it was 1/40,000 and the *altimétrique* was 1/25,000. It was executed by the Curé of Pont St. Martin. F. T. WETHERED.

The 'Allgemeine Schweizer Zeitung'* and the 'Echo des Alpes' (No. 3, 1888, pp. 168–173), give an account of another remarkable relief of a part of the higher Swiss Alps which has been on exhibition in the Kunsthalle at Basel. It comprises the Oberland district from the Jungfrau to the Wetterhorn (covering the district included in sheets 396, 489, and 493 of the Siegfried map), and has been executed on the unprecedentedly large scale of 1/10,000. The present relief is but a portion of a larger whole, for it is intended to take in ultimately the district comprised in sixteen sheets of the map, from near Thun to the Val Formazza, and from the Trübsee, near Engelberg, to the Wildstrubel. This is to be 23 feet in length, by 2 feet 9 inches in width. The execution of the portion already terminated began in 1884, and has cost 22,000 francs, though it is less than one-fifth of the whole scheme. The author, Herr Simon, of Basel, the well known Federal engineer, was in the service of the Federal Topographical Bureau, and himself took part in the triangulation of the district he has represented, and in the taking of 2,000 photographs. Professor Forel pays the highest tributes to the exactness and value of the relief, whether from an artistic or a scientific point of view, but some doubts are expressed (in the former account) as to whether the use of colour in the relief is desirable or advantageous, though M. Forel highly commends the half tones adopted by Herr Simon. M. Forel gives some

* The article is reproduced in No. 16—August 1, 1888—of the *Schweizer Alpen-Zeitung*.

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technical details as to the process of executing the relief, which are very interesting, but which we have not the space to reproduce here. It seems to be a most remarkable production, and it will be remembered that in 1883 Herr Simon was awarded a diploma of the first class for his relief of the Upper Engadine (scale 1/25,000).

The 'St. Moritz Post and Davos News' for July 11, 1888, announces that Herr X. Imfeld is engaged on a relief map of Central Switzerland which is to be shown at the Paris Exhibition of 1889. The same paper states that Herr Imfeld has only been able to dispose of a single replica of his remarkable relief of the Zermatt district. This has been bought by the South Kensington Museum for the sum of 80*l.* Thus it is now possible to study this remarkable relief in London as well as in Zermatt. The Swiss Alpine Club has under its consideration the possibility of inducing the Federal government to execute a relief (on a scale of 1/25,000) of the mountainous regions of Switzerland.

Alpine Accidents.—The Austrian Minister of the Interior issued on June 30 last a notice to the local officials under his jurisdiction concerning the measures which they are to take in order to prevent the fatal accidents which are continually happening in the mountains. He urges them to do all in their power to secure that the guides shall receive a proper training, and that a moderate tariff of guides' fees shall be drawn up. Local authorities are specially charged to aid the Alpine societies in improving paths, building shelter huts, &c., and, of their own initiative, to put up warnings against going to certain places known to be dangerous, and to look after any rails or other means of precaution which it may be thought advisable to put up. On the other hand, they are informed that they are not to further, by indicating the way in any fashion, the ascent of mountains by dangerous routes.

On this circular one may remark that the means suggested may no doubt be effectual in putting a stop to the many fatal accidents which happen every summer on minor peaks and passes in the Eastern Alps, and which are apparently far more numerous there than in the Central and Western Alps. It does not, however, pretend to deal with the means of preventing accidents during ascents of the higher mountains, in which cases the Minister is no doubt of opinion the members of the party ought to be more or less practised mountaineers. That they are not is shown by the long list of high mountain accidents every summer, and this state of things will continue till it is realised that the ascent of a high and difficult peak requires qualifications of quite a different kind from those desirable for mere excursionists and holiday makers.

NOTICES.

Humoristische Naturgeschichte des Alpinen Menschen. Von Ludwig Petzendorfer. (Stuttgart: R. Lutz, 1888. 1*s.*)

We have received from the publisher a copy of the second edition of this little work, which is adorned by ten rather sketchy illustrations. It is a pseudo-zoological account of the types of men and women, native

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or not, which are to be found in the Alps. German humour is generally heavy, and this case does not seem to be an exception to the general rule. Some of the Latin names given to the various species of 'homo alpinus' are rather clever; e.g. H. Mentorophagos (climbers without guides), Pseudo-homo Felucius Vampyr (landlords), Homunculus Capriciosus (goatherd). The descriptions as a whole are, however, very commonplace, and the illustrations do not contribute much to the book. Alpine satire has hardly been distinguished for fine wit or humour. Herr Petzendorfer's book seems to have met with great success among his fellow-countrymen, but will hardly do more than raise an occasional smile on the face of a foreigner.

Schutzhütten und Unterkunfthäuser in den Alpen. Zusammengestellt von Josef Rosenthal. (Munich, 1888).

Herr Rosenthal in the above pamphlet of eight quarto pages has carried out an excellent idea. He has produced a complete and exhaustive list of all the club-huts and the high mountain inns (at a height of 5,000 feet, or over) which are to be found in the Alps from the Viso in the west to the Julian Alps in the east. They are arranged in order under the districts to which they belong; and the height, proprietor (whether a club or a private owner), date of erection, nearest village, chief peak to be reached from the hut or inn, and certain particulars as to the accommodation in each case, are set forth in succeeding columns. There are several misprints and one or two rather startling statements as regards the huts in the Cottian and Dauphiné districts; but otherwise the list seems to be extremely accurate. Herr Rosenthal has been aided by M. Martel of Paris, Signor Cainer of Turin, and Herr A. Wäber of Bern. His pamphlet is printed, apart from its more bulky publications, by the German and Austrian Alpine Club. This is doubtless due to the fact that more club-huts and higher mountain inns exist in the Eastern Alps than in any other parts of the chain. In fact, five out of the eight pages of the present list are devoted to the Eastern Alps, beyond the Swiss border. Such lists had been previously published by single clubs and for single districts ('Alpine Journal,' xiii. 276), but this is the first time a general list has been put forth, and it will be extremely convenient to all climbers as containing authentic and detailed information which has hitherto been very hard to get, and then only in a fragmentary shape in guide-books. Herr Rosenthal has deserved well of all Alpine travellers, and we trust that he will meet with sufficient support to induce him to keep his list posted up to date.

In this connection the following statistics, up to June 1, 1888 (taken from the 'Echo des Alpes,' 1888, p. 154), may be found interesting, 2 recently opened huts being added. The total number of entries in the list (including such places as the Grimsel, Montenvers, Belalp, and the Monte Generoso) is about 458. Of these 5 are in the Cottians, 24 in Dauphiné, 11 in the Graians, 26 in the Mont Blanc district, 38 in the Bernese Oberland, 8 in the Alps of Uri, 6 in the Tödi group, 8 in the Appenzell hills, 36 in the Monte Rosa district, 2 in the Lepontines, 9 in Ticino, 2 near the Italian lakes, 2 in the Albula, 1 in

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the Adula, 5 in the Silvretta, and 12 in the Disgrazia-Bernina district—in all 195, leaving 263 which are situated in the Eastern Alps. Of these 458 inns and huts, 5 belong to the Société des Touristes du Dauphiné, 21 to the French A. C., 37 to the Swiss A. C, 49 to the Italian A. C., 50 to the Austrian Tourists Club, 123 to the German and Austrian Alpine Club, 4 to the Austrian Alpine Club, 6 to the Trentino Society, and 4 to the Friuli Society—in all 299, leaving 159 to smaller societies and private owners.

It is added that 210 of the 458 are of the nature of inns as distinguished from club-huts.

Cronaca del Club Alpino Italiano dal 1863 *al* 1888. Compilato da Scipione Cainer. (Turin, 1888.)

The work was issued by the Italian Alpine Club to mark the completion of its first quarter-century of existence. Signor Cainer (the indefatigable editor of the club publications) has with great care and trouble brought together a vast mass of material for the history of the club. He has only aimed at giving a chronological summary of the chief events in its history, and has added several very handy tables, showing the names and succession of the presidents and central committee, and exhibiting in tabular form the rise and growth of the sections making up the club, as well as the finances of the club as a whole. There are also lists of the founders of the club, of the general assemblies and congresses, of the works edited or compiled by sections or individual members, besides detailed notices of fifty-nine huts (including some abandoned or only projected) built by or under the care of the club, of paths improved, and meteorological stations established by it. In short, in this book of under 100 pages we have an admirable view of the state and work, past and present, of the oldest of the Continental Alpine Clubs. A remarkable feature is the list of first ascents made by Italian members of the club. This numbers 279 entries. We have noted a few mistakes of no very great importance, and such as always occur in a first edition. 167 of these entries refer to the Cottian and Graian Alps, the Ciamarella accounting for nine of them. It is, so far as we are aware, the first attempt of the kind, and Signor Cainer deserves great credit for the conception and execution of such a novel scheme.

Signor Cainer cordially acknowledges the aid he has received from Signor Isaia's little volume (noticed in these pages, vol. xi. 125). The Alpine constitutional historian will find plenty of material in both for solving the very intricate relations of the Turin section to the Club. From 1863 to 1866 it was the Club itself, from 1867 to 1872 it became surrounded by subordinate branches, while from 1872 to 1875 it was the central section, with independent sections grouped around it, and it was only in 1876 that the government of the Club became entirely separated from any one section. The Alpine lawyer has a fine field open before him, as well as the Alpine historian.

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Südbaiern, Tirol und Salzburg, Oesterreich, Steiermark, Kärnten, Krain und Küstenland. Von K. Baedeker. 23rd edition. (Leipzig, 1888. 7*s.*)

It is scarcely necessary to do more than announce the appearance of a new and thoroughly revised edition of this excellent guide-book. It can be cut up into 9 sections, each separately sewn, and rejoices in no fewer than 34 maps, 10 plans of towns, and 7 panoramas. Baedeker has always been famous for the excellence and clearness of its district maps. In this edition 5 new maps are added—environs of the Starnberger See and of the Achensee, Kaisergebirge, Karawankas Alps, and the Ortler district. For the latter we are informed that the unpublished results of the new Austrian Survey, as well as the new Italian map, have been utilised. It is certainly much clearer and better than that (say) in the 21st edition, though it is only on a scale of $\frac{1}{125000}$. It is scarcely possible to wish for a handier and more accurate general guide-book to the Eastern Alps, though of course it is not specially and exclusively meant for mountaineers.

Illustrirter Führer durch Oesterreich-Ungarn. Von Julius Meurer. Vol. i. (Vienna: Hartleben, 1888. 5*s.* 6*d.*)

This latest volume of Hartleben's well-known series of illustrated guide-books to various parts of the Eastern Alps is due to the pen of Herr Julius Meurer, who has a very wide acquaintance with every part of the Austrian Empire. The first volume, now before us, takes in Austria, Moravia, Bohemia, Istria, and Dalmatia, and gives us a minute description of the routes branching out in every direction from Vienna, which is taken as a centre. It contains 34 maps and plans, and 63 woodcuts, the latter being considered indispensable in all Austrian guide-books. From this description it will be seen that it does not devote special or exclusive attention to the mountains, but will, no doubt, be very useful to anyone visiting Austria for any purpose, while Herr Meurer's name is sufficient to assure us that the information in it is the latest and most accurate that can be obtained. The second volume (to be published in 1889) will describe Hungary, Galicia, the Bukowina, Bosnia, and the Herzegovina.

The St. Moritz Post and Davos News. Summer issue, 1888.

It is customary in Germany to print before the list of pupils at a great school a grave and weighty dissertation, on some learned subject. Now the 'St. Moritz Post and Davos News' reminds us of this German practice, but with an agreeable difference. The 'Liste des Etrangers' sojourning at the various hôtels in the Engadine and at Davos answers, it is true, to the list of pupils; but the dissertations which precede it are far lighter and more amusing, though perhaps none the less valuable for that, than those of its scholastic rivals. In the issue of the 'Post' for last summer (twenty-two numbers), now before us, we find that a serial novel has been running, and that all the dances, concerts, and other events of the season in the Engadine and at Davos are duly recorded. In these pages, however, we have to look more specially at its Alpine

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portion, which is understood to be looked after by a well-known climber and writer who is permanently resident at St. Moritz. There are a number of paragraphs in each issue recording the chief events of the mountaineering season, and including news from Zermatt, Grindelwald, Chamonix, and even Dauphiné. In addition there are many longer articles on Alpine subjects. Mrs. Main contributes a series on various Swiss subjects (*e.g.* the constitution, army, education, chamois hunting, life on the pastures, avalanches, glaciers), which will give much information, not always generally accessible, to Swiss travellers and show them that there is something in Switzerland besides mountains and inns. Signor Vittorio Sella describes his winter traverse of Mont Blanc and his visit to Etna. Mr. Howard Knox tells the tale of an exciting ascent of the Scerscen from the Italian side. Mr. C. C. Branch has found a new and apparently difficult route up the Piz Morteratsch, which shows that the Alps are not yet exhausted. A contributor, writing under the *nom de guerre* of 'Ice Axe,' sends a series of sketches entitled 'Zermatt Etchings,' and several other papers, all of which are amusing reading, though sometimes unintentionally so. Altogether much Alpine information can be gathered from the columns of this little paper; and if its 1888 winter issue (fortnightly) is only like that of 1887 the moderate subscription (15 francs for forty-five numbers, or 8 francs for either the summer or the winter issue alone, post-free to England) is well worth paying, for last winter the descriptions of the tobogganing and of the winter life generally of foreigners in the Engadine were extremely interesting and well done. The editor, Mr. F. de Beauchamp Strickland, resides at St. Moritz, and the London agents are Smith & Son, 186 Strand.

Errata in last number.

Page 13, line 27, *for* 'Bezingi' read 'Mishirgi.'
" 23, footnote, *for* 'December' *read* 'November.'
" 38, line 10 from bottom, *for* 'D. Sec. R.S.' *read* 'D.Sc., F.R.S.'
" 45, " 10–11 from bottom. I am glad to be able to correct an error in this passage where I speak of Baron F. von Richthofen as dead. So it had been announced in England, on what seemed excellent authority. The death of a relative had caused the mistake. Being very busy I missed the correction, and only discovered the error when, at the Bath meeting of the British Association last autumn, I was introduced to the Baron, and found from the hearty grasp of the hand that it was no ghost. May he live to full fourscore, to enrich science from his ample stores of knowledge!—T. G. BONNEY.
" 58, " 9, *for* 'sashines' *read* 'sagenes, each of which equals seven feet.'
" 66, " 3 from bottom, *for* 'Livry' *read* 'Lioy.'
" 66, " 26, *for* 'Abbott' *read* 'Abbot.'

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THE

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(No. 103.)

An Expedition to the Caucasus.

By HENRY WM. HOLDER.

(Read, in part, before the Alpine Club, February 5, 1889.)

At the winter dinner of the Club in 1887 the members were encouraged to go to the Caucasus, and were warned against going. I was disposed to take the encouragement more seriously than the warning, and I was specially induced to attempt to organise an expedition in the summer of 1888, because I discovered that there was a young Armenian then studying at the Owens College who gave me to understand that he spoke Russian, Tatar, and several of the Georgian dialects, and who, moreover, would rejoice at the opportunity of joining me in the proposed expedition, and acting as interpreter to the party. It may, perhaps, be as well to state here that, when the time for completing the final arrangements arrived, my Armenian friend was unable to accompany us. However, with the hope of securing so valuable an ally, I had little difficulty in persuading my friend and fellow-citizen, Mr. Hermann Woolley, to make one of the party. We then tried to secure another companion. I asked Mr. Harry Fox. He declined, his reason being, as he explained afterwards, that he was pledged to accompany Messrs. Dent and Donkin, should they discover that circumstances admitted of their undertaking the journey. One or two other attempts at securing an additional companion having proved futile, Mr. Woolley and I resolved to start by ourselves.

We obtained the services of Ulrich Almer as leading guide, leaving the decision concerning our second guide or porter to a later date. We then made all arrangements for a party of four (ourselves and two guides), and shipped tent, blankets, sleeping-bags, a liberal supply of provisions, &c.,

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for Taganrog. Before we ourselves had actually set out, however, we were introduced to Mr. J. G. Cockin, and invited him to join the party, an invitation which he gladly accepted.

We had carefully read and studied the papers published in the Journal by Messrs. Dent, Donkin, and Freshfield, and, as my time was limited, decided to proceed to Bezingi as expeditiously as possible, pitch our tent as high up by the Bezingi glacier as we might find convenient, and continue the explorations of our predecessors in this district. As neither Mr. Cockin nor Mr. Woolley was under the necessity of returning to England by any fixed date, it was quite understood that in all probability they would both, after I was compelled to leave, and should the conditions prove favourable, remain for a longer period in the neighbourhood, and cross over to the south side of the chain. As is now well known, Mr. Woolley was compelled to leave with me, on account of the disablement of his arm.

Messrs. Cockin and Woolley proceeded by way of Grindelwald (where they picked up Almer, and engaged Christian Roth as second guide) to Vienna and Odessa. I started from London on the morning of August 4, travelled by the Queenborough and Flushing route to Berlin, and thence without delay to Moscow, where I arrived on the evening of August 7. Spending only one night in Moscow, I pushed on to Rostov, where on the evening of the 9th I met my companions, the two guides, and an interpreter (Hermann Rehfeldt), who had been engaged at Taganrog.

On the afternoon of Friday, August 10, we started in a crowded train for Kotlarevska. This station was reached about 1.45 on Saturday afternoon.

Our experiences, after leaving the railway, were very similar to those described by other travellers in this district. We drove in three tarantasses (rude four-wheeled travelling waggons without springs) across the flat uninteresting steppe, almost smothered by the most dense clouds of dust that I have ever seen. At the first station, about half-way between Katlarevska and Naltchik, we had some difficulty in procuring horses. But I flaunted before the postmaster a letter from the Russian Ambassador in London, with which, through the courtesy of Sir James Fergusson, the Under Secretary for Foreign Affairs, I had been provided, and this, with the promise of an extra rouble, had the desired effect. It was getting dark, however, as we started, and before we had been an hour on our journey it was absolutely impossible to distinguish any objects on the road. It rained hard, but we

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infinitely preferred the rain to the dust we had experienced in the first half of our journey. Soon after ten we arrived at Naltchik, and obtained admission at the house of a certain Michael Sergevitch Michaelov. A couple of good rooms were placed at our disposal, but there was only one small bed, and so the bulk of the party were compelled to spread out their blankets and sleep upon the floor.

In the course of the next day we called on the Nachalnik (an act of civility which should not be omitted by visitors), and repacked our goods in saddle-bags and bundles for conveyance to Bezingi. We engaged as guide a Tatar named Muhammed Abajevoh, and, having agreed with him for the provision of horses for the next day's march, strolled about the little Russian town, enjoying the views of the distant snow-clad mountains, which now sparkled in the brilliant sunshine.

The next morning we found the need of that 'infinite patience' which Mr. Donkin had pointed out as the 'greatest requisite of all' for visitors to the Caucasus. We had ordered ten horses. They had been promised for 4 A.M. At four punctually Abajevoh appeared. I was sleeping soundly, and when aroused expressed my doubts about the punctual fulfilment of the contract. Woolley upbraided me as a laggard whose faithlessness was inspired by sloth. 'The horses are there,' said he, 'tethered to the railings.' I looked through the window and in the dim light saw that his assertion was true. We all got up, gulped down our coffee, hurriedly finished our packing, and prepared to start. Then we discovered how shamefully we had been deceived. There were only four out of our ten horses. After a little while two or three more appeared. Then a mule. Woolley demurred to regarding this as a *horse*. But remembering Mr. Dent's 'Garlic,' I suggested it should be allowed to count. It did not disappoint us. But after our tale of horses was complete there were the almost interminable discussions concerning the apportioning of the loads—the Tatars quarrelling amongst themselves and urging upon us the necessity of additional horses—so that it was 8.30 before we had fairly started.

The journey to Bezingi was not pleasant. The saddles were not comfortable. The stirrups were strapped up at shorter lengths than we found convenient, and the buckles were so stiff that the evils could not be remedied. Cockin soon decided to abandon his horse and walk. There were frequent halts, ostensibly for the purpose of rearranging the loads.

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But we were suspicious of other motives, and considered it prudent to be always present when such rearrangements were carried out. We most of us walked and rode alternate stages. Our interpreter had a sorry time. He was unaccustomed to walking and ill provided with boots, so that when he tried walking he was soon footsore and weary. He was equally unaccustomed to riding, and when he rode the results were not of a more satisfactory nature. A heavy thunderstorm came on just as we were at the steepest part of an ascent through a dense wood. When the storm was at its worst the horse carrying the tent fell, and its burden rolled off. There were growls and mutterings besides those of the thunder.

About 6 P.M., however, we arrived at a picturesque glen called Kara Su, charmingly situated at a point where a stream from the west joins the river Urban, and here we decided, or rather it was decided for us by the inability of the horses to proceed further, to spend the night. There is a cowherd's 'kosh' or shelter at Kara Su, where we got buttermilk, fresh milk, and a bed of hay. The proprietor of this 'kosh' desires us to recommend it to our English friends. Well, the milk is good, the charges are not high, and the shelter is quite as well constructed as, say, the hut on the Weisshorn. By all means, if you get benighted at Kara Su, stay there. There is nowhere else to stay.

The next morning there was the same delay in getting off—the same need of infinite patience. The natives will chatter. 'I see,' said Ulrich, 'these men always talk two hours before they walk.' But they can go when once you get them started. We did get off at last, and after innumerable halts for the readjustment of the loads, and for the purpose of giving Rehfeldt (who was by this time in a most unhappy frame of mind) frequent rests—the tedium being, however, relieved by the grand character of the ravine through which our way for a considerable distance led, and by fine views of the 'Saddle Peak' in the distance—arrived at Bezingi about noon.

Civilisation is beginning to exercise its influence at this Tatar village. The spirit of competition has crept in. The tall Starshina expected to entertain us, and waited, with his retainers, to receive us on our entrance to the village. But we were beguiled to the house of another important man (Doulet-Kari-Süjunshef), whose son, a youth of seventeen or eighteen years of age, had accompanied us from Naltchik. His house boasted a wooden floor and an iron roof, and

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the accommodation provided for us was certainly of a more satisfactory character than that obtainable from the Starshina. All arrangements had been made for our reception, young Süjunshef having ridden on home the previous night. Carpets were laid upon the floor; cushions and mattresses were brought into requisition. There was a profuse display of the art treasures of Bezingi, and every appearance of comfort. We were hospitably entertained, though, as we regaled ourselves on the verandah with the buttermilk, tea, cakes, butter, and cheese, and later in the evening with the mutton which had been specially provided for us, we discovered that the natural vigour of the curiosity of the Bezingese was not abated.

In the afternoon we called on the Starshina, who had donned his robes of state, and was evidently expecting the visit. At our request he sent for the hunter who had been engaged by Mr. Mummery a little earlier in the season. Then, having arranged for porters and horses for the continuation of our journey on the morrow, we turned in for the night. I will not enter into details concerning our experiences, but will merely suggest to all who propose to visit Bezingi that it is of the utmost importance that they should carry with them something more effective than the best insect powder obtainable in England.

At eight o'clock on the morning of August 15 we started from Bezingi, having settled, as we understood, that we should be conducted to Messrs. Dent and Donkin's second camp. We followed the left side of the stream till we reached the snout of the Bezingi glacier. Then the loads were transferred from the horses, which had been able to get to this point without difficulty, to the porters. A mule and a donkey, however, crossed the glacier with their loads, and went with us as far as the porters were willing to go.

Following the moraine on the right of the glacier, we arrived about four in the afternoon, in a thick mist, at a cave or 'kosh,' called by the natives the 'Misséss Kosh,' which we were assured was our destination. Had the afternoon been clear, we should probably have insisted on being conducted to a much higher position, as we regretted frequently afterwards that our head-quarters were so low down. The 'kosh' was about 8,400 feet above the level of the sea, and some 500 feet below (and on the opposite side of the glacier to) the camp of Messrs. Dent and Donkin in a previous year. We pitched our tent, and after our first evening meal in our new quarters I proposed that, as we intended

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to try Messrs. Dent and Donkin's route, and consequently need not waste time in reconnoitring, we should sleep out the next night and try Koshtan Tau. The proposal was greeted with enthusiasm and unanimously adopted. For we were all keen to try this peak, in which our interest had been aroused by the description in the Journal. We thought it a virgin peak. And I am sure all readers of the Journal, including the gentleman to whom the credit of the first ascent belongs, will not be surprised that we experienced some disappointment when we learnt from the hunter—so far as we could understand him—that Mr. Mummery had been there not many days before, 'had slept out one night and had climbed Koshtan Tau; had slept out two nights and had climbed Dych Tau; and had slept out again one night and had climbed Gestola.' The hunter's assertion seemed to derive some confirmation from the discovery, the next morning, of a label bearing Mr. Mummery's name. This, however, did not deter us from the execution of our project, and so at 2 P.M. on the 16th we started as we had arranged.

We moved somewhat slowly over the level glacier, leaping the few crevasses which came in our way, drinking in the wonderful indescribable impressions of the majestic mountain scenery of this district, and experiencing more and more as we rose higher and higher the exhilarating influences of the magnificent climate. About 4 P.M. we passed Messrs. Dent and Donkin's camp. Then we took to the 'long and level' moraine on the glacier's right, and soon got a view of the whole range of mountains from Shkara to Gestola. We pushed on past a slight shelter on the moraine which the hunter assured us was Mr. Mummery's sleeping place, and, taking to the right moraine of the Koshtan glacier, and ascending its screes, came at 6 P.M. upon a place of rest very little above the ice-fall at the junction of the Koshtan with the Shkara glacier. There was little shelter. But a huge boulder afforded some protection from the wind. And by the erection of a low stone wall we secured a fairly comfortable place in which to spend the night.

The next morning (August 17) we made a good start, getting off at 3.30. We proposed, as I have intimated, to follow the route taken by Messrs. Dent and Donkin. We had accomplished the 'easy bit of rock climbing,' and got 'out of the range of the séracs of the small hanging glacier,' to

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which reference is made by Mr. Donkin,* by 5.15; but we made no stop till we reached, at 5.45, some rocks which lie a little below the schrund. Here we made a short halt. From this point we met with no serious difficulty till we reached the belt of 'ochry-red' rocks. But here our troubles began. For some little distance we worked steadily up the south-western arête. Then a gendarme, covered with ice, blocked our way. We successfully turned this, but then another came into view. There was suspicion of others still. Ulrich unroped and reconnoitred, to save the whole party a fruitless climb. Shortly he returned with the gloomy intelligence that further progress in that direction was impossible. We moved towards the right on to the south face of this south-western arête, and ascended again. The white granite rocks lying immediately above the ochry-red layer were good for a short distance, but soon large smooth slabs covered with ice compelled us to descend. Another ascent, and another check of the same kind. Then we attempted a traverse, though from the character of the rocks and the size of our party it was a dangerous experiment. But all was of no avail. There was no help for it but to descend some hundred feet and try a longer détour to the right. We probably lost at least two hours in these fruitless efforts. At last, however, after bearing some distance further to the east, we hit upon a promising line of ascent. A small couloir helped us somewhat, though as it was full of ice we could not spare the time to cut our way up it. We kept to the rocks on its true right as much as possible, though these were generally very loose, and sometimes difficult. Still we had hopes of reaching the summit. But our work did not seem to tell on the great peak above us. Gradually our pace grew slower. The day wore on, and we began to wonder whether after all we should not be unsuccessful. We crossed to the left of the couloir, and soon reached a ridge west of the peak, and about, at the point at which we stood, on a level with the summit of Gestola (about 16,000 feet). We looked up and saw at least 1,000 feet of rock above us, whilst a difficult traverse must be effected before we could make a fair start, and the true top might, moreover, be some hundred feet behind the highest point in view. 'Can we do it?' I asked. 'It will take us at least three hours,' said Ulrich, leaving us to draw the inference. It was 1.30 P.M. We had been hard at work for ten hours,

* *Alpine Journal*, xiii. p. 247.

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and, it being the first climb, we all showed indications of fatigue. Although the weather was fine there were clouds floating about, and we remembered the experience of our predecessors as they descended the same mountain. Three more hours! It would then be 4.30. And even then there might be stiff climbing to be done. It would be dark by 7. Evidently, if we reached the top, we could descend but a very short distance before nightfall. And suppose those clouds meant mischief? I don't know who was bold enough to be the first to say, 'I think we had better return,' but we all recognised the wisdom of the suggestion, and commenced to retrace our steps. Slowly and sadly we descended, the loose stones, which it was impossible to avoid dislodging, making progress dangerous. We reached our sleeping place at 9.30 P.M., and now were the victims of a misplaced confidence. When we started in the morning, we thought the splendid rocks of the face towards us would 'go' anywhere. 'We can make the summit in seven hours,' was Ulrich's prophecy. So we had sent the hunter back to the tent with our sleeping bags and cooking utensils, being certain that we should get back to the tent before nightfall. So here we were, with night upon us, at a height of about 11,000 feet, without bags or rugs, and with very little food. There was no help for it, however. We lay down under the shelter of our boulder and wall, huddled together, and for three or four hours slept peacefully and soundly. Then, at earliest dawn, we started somewhat disconsolately for our tent. What had we gained? We had learnt, what Mr. Donkin had tried to teach, but which only such an experience would make us realise, how great were the distances and how deceptive the appearances amongst these huge mountains of the Central Caucasus. We had learnt something of the character of the work before us. We had discovered that mountaineering in the Caucasus, at least under existing conditions, was a very different thing from mountaineering in the Alps.

But we were not to be daunted by one failure. We did not, however, like the 'fag' round to the foot of the Koshtan glacier, and so had all been on the look-out for a more satisfactory route. It was suggested that the northern arête might be more feasible. Consequently, on the morning of the 19th, Almer, Woolley, and I crossed the glacier to reconnoitre. We came to the conclusion that though here and there we might meet with serious difficulties, yet these difficulties would probably not be insurmountable if only the

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real top were not cut off from the northern ridge. And this could only be tested by making the attempt.

So at 2.30 in the afternoon we started. Following the moraine on which our camp stood, we soon came upon the Misséss glacier, and at once struck up the middle of it, finding the ascent steep but easy. At 5.25 we had arrived at a ledge of rocks on the right of the glacier, which seemed to be a convenient place at which to spend the night. I may perhaps state here that this ledge can be more easily and more quickly reached by ascending a couloir which is passed before the glacier is struck. Only, in a wind, the couloir is raked with stones. We descended by this route, and did not enjoy the experience. Our sleeping place was, as registered by the aneroid, 500 feet higher than our sleeping place by the Koshtan glacier. This was so far in our favour. As we were by this time getting accustomed to the luxury of a hard bed, we spent a better night, and in consequence were somewhat late in getting away on the following morning, not leaving till 4.45. We crossed the glacier to our right and arrived quickly at some screes and rocks, which lay immediately under the depression in the arête which we hoped to gain. We worked straight up these, having now and then a short bit of really good rock climbing, and then, to avoid the séracs of the ice-fall, which did not look promising, kept close to the rocks, which bound the ice-fall on its right. We were really in a sort of cleft, with ice on the right hand and rocks on the left. This was the most disagreeable part of the whole climb. Step-cutting was frequently necessary. Though early in the day, water came trickling down, causing considerable annoyance. Occasionally the steps gave way as the second or third man got on to the rotten ice. Ultimately, however, all difficulties were surmounted, and we gained the snow-slope above the ice-fall. The slope was very steep, and steps had to be cut the whole way up to the depression in the arête. We reached the depression at eight, and stopped for breakfast. Below us was the Mishirgi glacier. To the right arose the precipitous north face of Koshtan Tau and the 'extraordinarily steep range connecting it with Dych Tau.' Directly opposite to us was Dych Tau itself, though the mists prevented our forming any opinion as to its accessibility on this side. And to the north of Dych Tau lay Mala Tau and Uku.

After breakfast we commenced our attack on the arête. First we ascended a snow-slope to the right of the actual ridge. At the lowest part of the slope, where the gradient

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was slight, we experienced no difficulty, as the snow was hard and easily traversed. Then, as the gradient became steeper, steps had to be cut. As we neared the arête again the snow became light and powdery, and climbing was difficult and tiring. Clouds collected and concealed all the summits, and a cold wind began to blow. Cockin's hat had been carried away on the Misséss glacier, and before we gained the ridge Woolley's had also taken flight. The ridge was reached at 9.35. We worked steadily up the arête for nearly 1½ hours, and then at 10.55 halted at the foot of a snow-slope for a short rest. The guides left the sacks, and we began to plough up the loose snow. At the top of the slope a steep bit of rock presented itself. It was smooth, steep, and really difficult, but fortunately free from snow and ice. There was only about one hundred feet of it, but we all treated it with the greatest respect. Above this the rocks of the arête were half covered with snow, and needed care the whole way. A little after one o'clock we sighted a peak covered with snow, which we at first thought was the true top. We pressed on and came upon it. Then we discovered that the true top was still farther on, and was separated from us by a depression of from fifty to one hundred feet. This was composed of jagged dark rocks, almost free from snow on the side turned towards us, and surmounting the highest crag was a slender cairn. The hunter was right, then—Mr. Mummery had first climbed Koshtan Tau. We hurried on, scrambled up the rocks, and at 2.5 P.M. stood upon the top of this noble peak. But we did not stay long. The wind was bitterly cold. The clouds looked more and more ominous. For a moment the top of Dych Tau was visible, and by the clinometer was seen to be somewhat lower than the peak on which we stood. We hastily gathered a few stones, scribbled on our cards an intimation that on August 20, 1888, we had climbed the mountain by the northern arête, deposited them in a sardine box, and then began rapidly to descend. By 6 P.M. we had arrived, without special incident, at the place of our morning's bivouac. We rested for a short time, and then started down the snow-slopes. But how were we to get over the ice-fall? Our morning's route was certainly impracticable so late in the day. Our best course, probably, would have been to have descended by one of the couloirs to our sleeping-place. But certain garments and other articles had been left on the glacier at the foot of the cleft, and this fact led us, in an evil moment, to decide on venturing down the rocks to the north of the cleft. It was possible these rocks would prove

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practicable, and if they should they would serve our purpose admirably. For a short distance all went well. Then, as the darkness deepened, our difficulties and our dangers increased. The character of the rocks was, of course, unknown, and we had nothing to guide us as to the best line in which to move. We were compelled to use the utmost caution. The rocks proved loose, and huge stones, dislodged by members of the party, frequently went crashing down hundreds of feet. Twice it was necessary to bring into requisition a smaller cord to steady us over steep faces of rock on which sufficient hold could not be found. It would, doubtless, have been bad enough in daylight, but in the dark the peril was extreme. More than once it seemed doubtful whether we should not be compelled to halt, resting on some narrow ledge, and wait for dawn. We did, however, steadily continue to descend. By-and-by we reached a couloir filled with snow. There were indications that in this couloir we were by no means safe from falling stones. But we lost no time, and soon, without accident, reached our sleeping-place at 10.45 P.M. and turned in for the night. Our camp was regained by the couloir to which I have referred at 10.30 on the following morning.

At the tent we found Süjunshef, our Bezingi host, and another Tatar of unprepossessing appearance, who had brought in a couple of chamois. These they skinned and ate, and though they unhesitatingly made use of our cooking utensils we were not invited to share in the feast. In the afternoon the wind dropped, but a thunderstorm with heavy rain came on, which lasted all the evening, and we experienced certain disadvantages of life in tents and Tatar 'koshes.'

The morning of the 22nd was fine but misty. We caught occasional glimpses of the summits of the mountains immediately opposite to us, and were impressed by their rugged outlines and their weird fantastic appearance through the veil of mist. As the aneroid had gone up, and as there did not seem to be much fresh snow on the mountains, we thought of starting from camp early the next morning and trying a new peak, or the pass now known as the Shkara col. The mist, however, increased, and the execution of the project was deferred.

The morning of the 23rd was gloriously fine, and we discussed the desirability of sleeping out for the Saddle Peak (which we had decided on trying, inasmuch as we were under the (erroneous) impression that Mr. Mummery had

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climbed Dych Tau, and as we thought it possible that Djanga, or Shkara, or both, might have been done by Messrs. Dent and Donkin's party from the south), or of making the attempt from the camp. The appearance of clouds and mist in the afternoon led us to adopt the latter alternative. So at 2.25 A.M. on the 24th we started. The moon shone brightly, and we had no difficulty in making our way along the glacier. But light clouds were floating about, and even at the time of our start we were uncertain whether to try the peak or the col.

At four we passed Messrs. Dent and Donkin's camping place, and at 4.35 we were at the foot of the rocky N.E. face, up which we had now tacitly decided to try to force our way. For ten minutes we mounted a slope of avalanche-snow which fills a bay in the rocks at the head of the very centre of the Bezingi glacier, then turned an easy corner and took a short jump on to good firm rocks on the left. We went straight up these rocks, which for a short distance afforded fair climbing, then over loose stones and up a short steep snow-slope to more firm rocks, where at 5.45 we breakfasted at a height of 11,800 feet by the aneroid. The weather was still cloudy and unpromising, and we had no great hopes of success. However, after a short halt we struck up the rocks, and for 1¾ hours were working alternately up steep snow-slopes, where steps had to be cut, and good-going rock. Then after forty minutes along a snow arête and over a little moraine, and we had come upon our first serious obstacle in the shape of a big schrund, overhung by masses of ice broken as usual into fantastic séracs. At this point five chamois and a steinbock which had retreated before us up the rocks circumvented us by scampering down the avalanche débris on the slopes to the left, and so regained the rocks up which we had climbed. The schrund gave us a little trouble. But Roth cleverly conquered all difficulties. A few steps up a steep wall of ice landed each member of the party successively in a kind of ice grotto. At the entrance to this grotto there stood a strong column of ice supporting huge bosses above, and by holding firmly on to this column with one arm and swinging forward, the first step on to the upper lip of the schrund could be reached. It was then only a question of two or three steps round an awkward corner to a place of safety. It needed caution and showed skill and enterprise on the part of the leader, but by 9.20 the last man was over; and, after another twenty minutes' step-cutting over hard snow, we halted again for about half an hour.

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From this point we worked straight up, step-cutting being necessary the whole way, by a succession of snow-slopes, under arches and between séracs of rotten glacier; Almer, who was now leading, preferring this shorter and more interesting, though more difficult route, to a long détour to the right, over what seemed to be only a monotonous snow-slope.

At 12.25 we had reached the top of the first plateau, and saw before us snow-slopes gently ascending to the south-east and south towards the summit of the Saddle Peak; whilst to our right they first sloped downwards, and then ascended towards the cone of Gestola. We turned to the left, and got well on to the second plateau at 1.10 P.M. Cockin remained on this plateau till our return. From this point the snow was deep, and very soft and powdery, and our progress was slow and wearisome. For three-quarters of an hour we toiled up the western face of the ridge; finally, we got on to the arête, where we found the rocks generally covered with the same kind of snow; and in half an hour more, at 2.25 P.M., we reached the summit. But it was very cold, and there was no view beyond occasional glimpses of the Adish glacier, the southern ridges of Djanga, and Gestola. Tetnuld and all other peaks were entirely hidden by the mist. We only stopped long enough to build a cairn and take some food, and so at 3.5 we were on our way down again. Comparing the summit with that of Gestola, we estimated that the height would probably be about 16,500 feet. We varied our route but little on the return journey, excepting that we kept to the snow as much as possible, it being now in admirable condition for the descent. We reached the Bezingi glacier at 6.45, and, with the aid of a lantern, arrived at camp at 10.10, having had some trouble with the séracs near our tent. I cannot be certain about the local name for the Saddle Peak. Young Süjunshef, our most intelligent informant, called it Kartuntau, or perhaps Katyn Tau, a name which appears in Koch's map of the 'Caucasian Isthmus.' But he, with all the other natives, had previously referred to the whole of the range from Gestola to Shkara as Djanga Tau.

On Saturday (25th), Woolley was suffering from a swollen wrist and arm, which caused us some alarm, but our anxiety was for a short time dispelled by the excitement caused by the receipt, at Bezingi, of the following letter from Mr. Donkin —probably the last, alas! that he ever wrote :—

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Bezingi, Friday, August 24.

DEAR SIR,—Having arrived here this afternoon from Chegem, and hearing from your interpreter that you are in camp on the glacier, and that some one is going up to you to-morrow, I send a line to say how much interested I am to hear that you have had some success, and I hope that the weather may mend and that you may be able to do all you wish. I am here with Mr. Fox only; Mr. Dent was unfortunately obliged to leave us at Betsho, not being very well, and is returning home *viâ* Moscow. We have climbed Dongussorun, and traversed a new and splendid pass from Uruspieh to Chegem—both in perfect weather. We are bound for Balkar and Gebi, and thence home by Batoum, hoping to see something of the Dych-su glacier on the way. If we cross the pass on to the head of the Bezingi glacier, we may perhaps meet; but probably you may not stay so long. Our guides are Kasper Streich and J. Fischer, of Meiringen. We leave this to-morrow. With kind regards, I am, dear sir, yours faithfully,

W. F. DONKIN.

At Betsho we had two good tries at Ushba; the first time we were driven back from the great couloir by avalanches; the second time we reached the vertical cliff by the S. arête. We could see no way up without more artificial aid than we had; indeed, I never saw a more forbidding precipice. Under good conditions the N. peak should be accessible by the couloir.

W. F. D.

H. W. Holder, Esq., Bezingi Glacier.

We arranged provisionally to start the next morning for the Shkara col, but owing to the unsettled state of the weather (there was a thunderstorm on Saturday, very high winds on Sunday, followed in the evening by rain and snow, rain and snow again on Tuesday), and the unsatisfactory condition of Woolley's arm, it was Wednesday (29th) before we got off.

On the 29th Cockin and I, with Almer, started at 4.30 A.M. for the Shkara col. We went quickly, arriving opposite Messrs. Dent and Donkin's camp at 5.45. Here, instead of taking to the moraine, we struck up the middle of the glacier, and in half an hour had got well behind the small ice-fall which is situated here. Above the ice-fall our route was practically over a level snow-field, down the centre of which coursed a small stream of water in a shallow channel of ice. At 7.7 we stopped for breakfast just below the main ice-fall of the glacier, and immediately opposite the junction of the Koshtan glacier with the Shkara glacier. We could clearly see the Mishirgi Tau on our left, though the tops of all the other high peaks of the neighbourhood were covered with clouds. On the face of the Mishirgi presented to us were three great couloirs, apparently filled with snow, and after some dis-

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cussion we came unanimously to the conclusion that if we made an attack upon this mountain our best plan would be to work up the couloir on the left, then by a short traverse to the right to gain the main central couloir, which stretched up to a depression on the arête to the west of the summit. It seemed as though the top could then, without serious difficulty, be reached by this rocky arête.

After breakfast we tried to work up the true right of the glacier, on account of the soft snow on the left. The left was, however, much the less crevassed, and we were compelled again and again to work towards it to make a way. Ultimately we got off the glacier on to gentle slopes of snow-covered rocks on its right bank. The head of the glacier expands into a large snow basin, whilst before the summit of the col can be reached a steep, almost vertical wall of ice, about 150 feet in height, has to be surmounted. We gained the summit at 9.45. Below us was the S-shaped Dych Su glacier, a branch of which seemed to run down between a spur of Shkara and the wild-looking Nuamquam, up which latter peak we could detect no possible route on the side visible to us. To our right rose abruptly the cliffs of Shkara, commanded by huge overhanging bosses of ice. Any attempt on Shkara by these rocks would evidently be madness in the extreme. We descended a short distance on the east side of the col, looking for traces of Mr. Donkin's party, as in his letter he had suggested that they would probably look at the Dych Su glacier, and might possibly cross this col. We found no traces, and as the descent upon the Dych Su glacier was evidently perfectly easy by means of loose but not unsatisfactory rocks and a tongue of snow, we retraced our steps to the top of the col, and then spent some hours in reconnoitring on the arête to the north-east, which constitutes the rim of the basin of snow to which I have referred. We were particularly anxious to examine Dych Tau, but the mists perversely obstructed our view, and we were compelled to descend with our desires ungratified. On our return we kept to the snow on the right bank of the glacier, and cleared the ice-fall by passing close under the ice-fall of the Koshtan glacier. Then we took to the moraine, and, though a heavy fog rested on the Bezingi glacier, we reached home, without any serious delay, at 5 P.M.

The morning of the 30th was gloriously fine, and the mountains were entirely free from cloud and mist. The opportunity was too good to be lost, and so it was resolved that

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we should sleep out for Mishirgi Tau. This mountain is misplaced in Mr. Freshfield's map. It lies but very little to the S.E. of Koshtan Tau, and to the west, not to the east, of the junction of the ridge from Shkara with that shown in the map as extending from Koshtan Tau. During the day a magnificent avalanche swept the N.E. face of the Saddle Peak. It fell from the plateau to the Bezingi glacier, a distance of probably 5,000 feet, and as it broke into its myriad atoms of ice and dust presented the appearance of a great cloud rolling down the mountain side. At 2.40 P.M. we left the tent, and at 6.40 we reached the sleeping-place from which our first attempt on Koshtan Tau had been made. A start was made the next morning at five. On a nearer view of the mountain the guides did not like the route which two days before we had fixed upon as the most likely, so we aimed in the first instance for the S.E. arête of the peak. For a quarter of an hour our way led over moraine. We then went up the middle of the lower glacier, and on to the left of the higher, the snow being good, and there being fewer crevasses on this side than on the other. The first ice-fall was surmounted with little difficulty, only a few séracs at the top giving any trouble. Above the ice-fall we crossed a snow-field to the left, and bivouacked on the first rib of rock at 6.55. Above this our route lay for a quarter of an hour over very loose rock, or screes, to a snow-slope immediately below the highest ice-fall. It was clearly possible to surmount this ice-fall by a long détour to the left, but it seemed feasible to force our way right through the middle of it, up the left of two vertical ice-walls, which formed the boundaries of a huge cleft at right angles to the general line of the crevasses. Without trouble we got well into this cleft, then crossed to a narrow ledge on the left wall by means of a sort of flying buttress, and here tried to zigzag up the almost perpendicular wall. We were completely brought to a halt about ten feet from the top. We were returning somewhat disconsolate, as the détour would now mean the loss of some hours, when Ulrich conceived the idea of attacking the wall a short distance to the left of our buttress. Here making use of Roth's back as the first step, and with the ice-axes driven up to the hilt into the snow (which by this time we were able to reach) as the remaining three or four steps, we were soon out of danger, and at 8.55 were on the last snow-slope we had to traverse. By 9.15 the schrund was crossed and we had reached the S.E. arête. From the point where we reached the arête we, for some

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distance, effected a traverse though moving steadily up all the time, crossing two or three patches of snow till we arrived at a couloir on the south face of the mountain. We worked partly up this couloir, step-cutting being necessary, and partly over rocks mainly covered with fresh snow, through which, on to the harder snow beneath, our footing had to be made secure, so that progress was tedious and not entirely safe. To vary the monotony we turned to the right and reached the arête again. But after a short advance a gendarme necessitated a descent of some fifty feet or so, and a traverse. We turned on to the arête again, and, finding the rocks good, made rapid progress. We were in high spirits, as we now had every reason to believe we should easily complete the climb. There was the top certainly, and not more than two or three hundred feet above us. Suddenly Roth, who was leading, having clambered to the top of a buttress which lay in our path, muttered something which I could not catch. But I knew there was something wrong. As hastily as I could I followed him, and then, to my intense chagrin, discovered that between us and the final peak there was a cleft probably at least two or three hundred feet deep. It was most tantalising. Across the cleft there was but a short distance ere the pinnacle constituting the summit would be reached, and this pinnacle looked as though it would prove a splendid climb. But we all recognised at once that we were beaten. It was 2.25 P.M. To descend and reascend over such rocks as were here would mean probably two hours' work, and then we should not get across the schrund before nightfall. We dared not face the prospect of scrambling down that mountain side in the dark. As it was, there was not much time for rest. By the clinometer we ascertained that the point we had reached was almost exactly as high as the summit of Gestola, so that the mountain will probably turn out to be a little over 16,000 feet. We descended by the same route which we had taken in the ascent. But the utmost caution was necessary. Our morning steps were partly obliterated, and partly filled with ice from the snow which had melted during the heat of the day and been again frozen. It was 7 P.M. and growing dark ere we had crossed the schrund and reached the snow-field below. Here some change in our route was necessary. It was impossible to descend by that vertical ice-wall at night, so we kept to the right of the slope, trusting there would be no serious obstacle in our way. But by this time it was quite dark and bitterly cold. The

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gradient of the slope became steeper, and the snow gave place to ice. Steadily we cut our way down this slope, groping for the steps the leader made, till suddenly Roth, after peering into the depths below, growled out 'Schrund,' and we were compelled to beat a retreat. We turned further to the left, and after some experimenting found ourselves on a snow-slope, down which we rapidly kicked our way, and ultimately found ourselves on the screes immediately above the resting-place of the morning. But if these screes had seemed bad in the morning, they appeared ten times worse at night. Every stone seemed on the move, and there was of course no chance in the dark of picking one's way. However, without serious mishap we reached at 10 P.M. a ledge of rock; and here, though we had neither bags, nor rugs, nor food, we thought it wise to wait awhile. But it was too cold for sleep, and after attempting for three or four hours, each in his own fashion, to fight against the cold, we started again, on the first appearance of the moon, Ulrich leading down the right side of the glacier as far as the lowest ice-fall. The deep shadows thrown by the blocks of ice in the moonlight made it prudent to defer the descent through the séracs till daybreak, so for three-quarters of an hour again we halted. At four it was light enough to proceed, and at five our sleeping-place was reached. Fearing that Woolley might be anxious on our account, we only stopped long enough to warm up and eat some soup which we had left, and then hurried to our tent, where we arrived at 9.30 A.M.

We had rain on Saturday and Sunday night, and, as I had calculated that I must leave camp on Tuesday morning, the only chance for another climb was to attempt something which could be accomplished in a single day.

On our ascent of the Saddle Peak we had been impressed by the fine rugged outline of Salananchera, and had decided on what seemed to be a practicable route. From this peak we could, if unsuccessful, retreat and reach our camp some time before nightfall.

So at 4.55 A.M. on Monday (September 3) we started. We crossed the glacier in thirty-five minutes, and in an hour had left the grass-covered moraine on the left of the Bezingi glacier, and were climbing the grass and shale-slope down which apparently Mr. Freshfield moved when descending from the Zanner Pass. A tedious climb brought us to the top of the col at 7.52, and from this point we had a grand view of the northern arête of Koshtan Tau. Half an

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hour's walk across the gently rising snow basin brought us to the schrund. This was crossed at the foot of a couloir which leads up to a depression in the western arête of the mountain. As the snow was in a very unsatisfactory condition, we took to the rocks on the left of the couloir. These rocks were very loose, but with care a fairly good going track was found, and at ten we had reached the depression to which I have referred. We clambered up a few rocks covered with snow of the light and powdery character to which we were now becoming accustomed, then up a snow-slope, the snow being still of the same character, and were fairly upon the rocks of the western arête. These rocks were generally good, the best on the whole that we had found in any of our Caucasian expeditions. There was occasionally some really good climbing, and we reached the dome of snow constituting the summit at 11.30. We had from the top the best view we obtained during the whole of our stay in the district. This was partly owing to the remarkable character of the weather. Almost every day opened fair—the early morning was bright and clear—then about noon clouds began to gather, and frequently in the evening there was thick fog and a suspicion of snow or rain. As we had never reached any of our high points of view before till after mid-day, the panorama was generally quite obliterated or we could obtain but very partial views. But here we were before noon on the top of a peak separated entirely from all the giants of the district, and the view was consequently of the grandest character. Immediately opposite—across the Bezingi glacier—S.E. by E. rose the magnificent Koshtan Tau; a little further to the east, almost due east from us, was Dych Tau, with its Silberhorn-like summit. To the south-east we could discern the shoulder of Nuamquam, whilst to the south arose, from east to west, the noble range of Shkara, Djanga, the Saddle Peak, and Gestola. Gestola lay S.W. by S. from us, and in a line a little to the west was Tetnuld in its shroud of the purest white. Immediately behind us was Tiutiurga, at the head of a fine snow basin, and away in the distance were Uschba and the western mountains of the central group. 'This mountain is to be recommended,' said Ulrich. And, indeed, such is the case. It is not so high as the mountains near; but as its summit seemed to be just on a level with the plateau from which the final cone of Gestola springs, it cannot be much less than 15,500 feet, and, with the excep-

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tion of the hour or two's grind over the shale or screes, it is as pretty a climb as one can well desire.

We descended by the same route, excepting that we took to the couloir about half way down, and glissaded over the avalanche snow. Now and then we were chased by stones which came flying down a couloir to the left, but we either outran them or dodged them, and so reached the camp without mishap. We were delayed in crossing the glacier somewhat, not reaching our tent till 5.10 P.M., owing to a thick fog which absolutely hid all our landmarks from view.

The next day Woolley and I started for home, leaving Cockin to win new laurels in these fascinating regions.

I have but little space left for giving my impressions of mountaineering in the Caucasus. I do so with diffidence, for they are subject to revision by a confident critic who has already expressed his views as follows *:—'The difficulties of the expeditions to the Caucasus have been unduly overrated and magnified. . . . That there are difficult peaks in the Caucasus no one can deny; but they are still unascended. The guides who have been taken from the Alps to this "great field for exploration" have usually been called upon to display those qualities we associate with a Dragoman.' No one, I venture to assert, with any real knowledge of the Caucasus could have penned the last sentence, and from all that I have read and experienced I have been unable to find any warrant for the first sentence.

I do not think that in any of the work we did there was any part so difficult that many climbs in the Alps could not be found to match it. But the difficulties do not lie in the nature of the climbing. They are found in the fact that it is continuous and strenuous for so long a period. They are intensified by uncomfortable sleeping-places, and sometimes insufficient or unappetising food. The unknown character of the mountains keeps the whole attention more intensely on the alert, and makes a greater drain upon the system. The conviction, too, that in case of accident there is no help near, adds severely to the strain. And the off-days are, I think, less restful; they are certainly far less luxurious than the off-days in the Alps.

Through the kindness of Mr. Cockin I have been favoured with the following account of his expeditions after we left:—

* *The Pioneers of the Alps*, second edition, p. 29.

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SHKARA.

Our route may be traced on the photo-print, 'Panorama from below Guluku,' published in the *Alpine Journal* for March 1887 (vol. xiii. p. 242); the mountain is there called Koshtan Tau. The great buttress shown in the photo-print runs up to the top of the mountain. We went up the side glacier shown to the proper right of this buttress, and, turning to our left, struck the ridge at the point where the photo-print shows much snow, below which is a sharp break-down in the ridge. We followed the ridge to the top.

At 4.55 A.M., September 7, we left our sleeping-place at the foot of the rocks shown in the left corner of the photo-print, crossed the Bezingi glacier, and went up the side glacier at first to our right of it, then passed through the upper ice-fall with little check. After a halt from 7.33 to 8, we crossed to our left the unbroken upper part of the glacier, and then having our backs to the buttress Roth cut up a snow-slope, not clearly shown in the photo-print, until we struck the ridge at 10.25. We halted till 11.12, and then went on with not more than five minutes' halt until we reached the top at 3.42. Up to the foot of the final ascent the ridge was sharp in several places of some length, the edge not being wider than the thickness of one's finger. Almer cut the steps three or four feet below the edge on one side or the other as suited. The wind was bitterly cold, but fortunately not strong; a high wind would, I think, make the ridge impossible. We reached the foot of the final ascent at 2.20, and had thence an easier climb, with less step-cutting. At last we came to a small space of nearly level snow a few yards beyond which rose two snow humps. The further of these was the top, the ground falling in every direction. We had only momentary views, but could see the ridge falling for a long way. The actual top was snow, and we were too cold to build a cairn on the nearest rocks. We descended after five minutes to the small space of level snow just below the top to eat; and while here the top of Koshtan Tau (Guluku) cleared, and I found by the clinometer that it was below us.

The descent was made with little halt, and we reached the sleeping-place by lantern-light shortly before 10.

We were not on rocks more than fifteen minutes all the way. The guides had at least five, probably six, hours' step-cutting.

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Salah-nancharah Pass.*

This pass is on the north side of, and the top of it is close under, the highest point of the range on the left side of the Bezingi glacier. A glacier comes down from it, the foot of which is opposite to Misséss Kosh (close to which was our tent); the 'kosh' is on the right moraine of the Bezingi glacier, some little distance above the point marked by a red star on the map facing page 258 of vol. xiii. of the *Alpine Journal*. The native hunter in my pay called this glacier 'Salah-nancharah,' and when I told him by signs that we had been at the top of this glacier, he said 'Booloongoo,' which I supposed to be the name of the valley on the other side. There was a large track of glacier on the Bulungu side. The descent on that side from the pass seemed easy.

We went to the top of this pass on September 11, following our right side of the Salah-nancharah glacier. We were two or three minutes under nine hours in going from the tent and back, including a long stay at the top. We put up a stone man.

Second Peak of Djanga.

We left the tent at 2.45 A.M. on September 12, and walked up the Bezingi glacier until 6.10, when we breakfasted near the foot of the rocks shown in the photo-print before referred to. We then went up the ice-fall and unbroken névé there shown, between Shkara and Djanga, until at 8.15 we came to the foot of the narrow glacier coming down from the ridge between two lines of rocks. We took to the rocks to our right of this glacier at 8.43. They were very sound, and, except in places avoided in the descent, easy. We halted from 10.10 to 10.52, and reached the top of the rocks at 12.18. Step-cutting followed all the way to the summit, which is at the Suanetian end of a short nearly level snow-ridge, and was reached at 2.46. We had a clear view, and found ourselves well above the Saddle Peak, and still more Gestola, well below Shkara, and a little below another point of Djanga. Our point is the one nearest to Shkara; the point further away, and appearing in the photo-print to be lower, is higher. Tetnuld had a cloud all to itself, but through a film of mist I saw the top long enough to fix the clinometer on it. I took no note of the angle, but remember estimating

* Mr. Cockin prefers this form to the one I have used in my account of the ascent of the mountain. I see no objection to leaving both forms and inviting critics to decide which is the more accurate (H. W. H.).

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that Tetnuld was very little below me. From the flashing glimpses I had of its summit, my first impression had been that it was higher than the point I was on.

Above the rocks we passed near to the wry-necked rock well seen from the Bezingi glacier; close to this is what looked as if it might be a pass into Suanetia. The Shkara ridge was clear; it looked a fine climb, but Almer thought one part of it would not go. Near the foot of the rocks we went up is a good sleeping-place.

After putting up a cairn on some rocks near, we left the top at 3.12, cleared the last rocks at 6.29, and reached the tent by lantern-light at 10.30.

Adine Col.

We left Misséss Kosh with six porters at 7.40 A.M. on September 17, taking our way up the slopes on the other side of the Bezingi glacier. When we came to the rock ridge with stone men, we bore to our left across the nearly level glacier; then, following a shale slope to the right, we came to the névé of the Bezingi glacier, and on it to the col lying close to the main Bezingi wall. This we passed at two. The porters stopped often on the ascent to talk. We found no difficulty on either side.

We camped for the night on the right bank of the glacier, near its end, and went on in the morning to Mulakh. The porters demanded 5 roubles each for the 'course' from Misséss Kosh to Mujal, and another 3 roubles for going on to Mulakh. I paid both demands, but thought the latter unreasonable, especially as their own delays prevented our reaching Mujal the night before. I gave them 2 roubles for provisions. At Mulakh was a man called Kosta Devidrian who speaks a little French. He made a good purveyor.

The North Peak of Uschba.

I tried Uschba three times, always by the couloir. On the first attempt, September 22, we had to turn back after four hours through Roth's illness. Severe rheumatic pains disabled him for more than a week after. Almer spiritedly agreed to go alone with me, and on the 24th he and I tried again. We lost time by going on to the ice-fall, finding what looked an easy way stopped by a schrund; and after Almer had cut steps for over five hours in ice, had to turn. There were then two days of bad weather, in which much fresh snow fell.

Almer and I left our tent, pitched just beyond the last

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trees, at 3.8 A.M. on September 28. The fresh snow was in a safe condition, but soft, especially below the schrund at the foot of the slope beneath the rocks of the north peak, and above the ice-fall. We passed the schrund at 8.3, having breakfasted on the way. Above the schrund we kept on the slope close to, but never going on, the ice-fall. An avalanche had swept off some of the fresh snow from the slope, and the going was a little better. Almer had in the upper part to clean out some of our old steps. When near to the rocks of the north peak we turned to our left. This brought us to the top of the ice-fall, right in the couloir between the rocks of the two peaks. We halted here, 10.5–10.45. The slope above was very steep, and the snow very soft. At 1.10 Almer broke through the edge on the neck. We were near to the south peak, but as the ridge leading to the top of this had much frozen snow and ice on it, whilst the rocks of the north peak looked easy, we turned at once to our right. Almer had some step-cutting before we could get off the neck and reach the rocks of the north peak. These were not difficult. The top, which we reached at 3.45, was snow, the highest point being an overhanging cornice; this we looked over, but did not venture to tread upon. Almer put up a small stone man a few feet below. We stayed on the top till 4.22, but were in mist all the time and could not ascertain whether the north peak was the higher or lower one. We had only a short look at the ridge from the neck to the top of the south peak, but were both inclined to think it would go, at any rate when clear of ice. At 4.22 we began the descent, and reached the tent at 11.20 by lantern-light.

I saw the forests of Suanetia later in the year, I believe, than any other English traveller has yet done. When I reached Betsho on September 19 the birch furnished the main mass of colour. But by the time I left, October 1, the deep red of the mountain ash and wild cherry was predominant. At sunset the woods seemed, in places, on fire.

A Winter Quartette.

By Mrs. E. P. JACKSON.

EITHER the days of witchcraft are at an end or I am a very degenerate descendant of the once powerful Lancashire witches. No ancestress of mine, taking her midnight ride, ever came to warn me of the fate the weird sisters were

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perhaps then weaving for me—that one day the story of my winter wanderings in the Alps might be required of me. A most imperfect story too, for I have not a note to go by, since, according to my usual custom, I contrived to lose my pencil—a piece of carelessness, by the way, which, taken with a few other small arrangements of the like nature, often increases the pleasure of the climb. When I started for Grindelwald the Christmas before last it was with the intention of trying what mountain work in the winter was like, and the programme was, if possible, to be brought to a brilliant conclusion by the crossing of the Jungfrau. My husband and I had tried it in bygone years more than once from the Wengern Alp, but without success, and I now thought it was just possible that, with the winter snow, and by starting from the Bergli instead of the Guggi hut, some of the difficulties often met with during the ascent in the summer might be lessened, if not altogether avoided.

On arriving at the Bär hôtel it was, however, very evident that until Christmas, and the New Year with its ball, had come and gone, nothing more serious could be thought of by the party assembled there than the amusements of the season. We arranged some picnics, one to the Faulhorn inn (where we had to dance a reel to keep ourselves warm), another to the Waldspitz, accompanied by three cameras and numerous dogs. We spent a day at Lauterbrunnen, but were much disappointed with the appearance of the Staubbach, and we tobogganed, or rather, as they say in the Vaud *patois*, 'luged,' every spare moment of the day. We had one splendid run, with a water jump at an awkward corner halfway down, over which some of the party were quite certain to come to grief, and a sudden plunge as a finish, which landed us, generally more or less buried in deep snow, on the banks of the Lütschine. There was always one drawback, however—the sledges had to be pulled up again.

On the morning of Wednesday, January 4, 1888, more than the usual amount of bustle was to be observed at the Bäi hôtel. There was much carrying to and fro of mysterious parcels, with a general parade of blankets, rugs, and other warm garments in the hall; guides, too, still fondly clinging to their axes and ropes, had been roused from their hundred days' sleep, and, like the Sleeping Beauty of olden days, reappeared to us exactly as we had left them in the summer. The reason for all this excitement and preparation was that two parties were leaving these comfortable quarters for the Schwarzegg hut, the one to attempt the Schreckhorn,

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the other the Lauteraarhorn, and they were to be escorted as far as the Stieregg by the whole strength of the company, cameras and dogs included. What a perfect walk it was! There was no dusty path with long strings of mules most carefully to be avoided, but a beautiful track up the middle of the Eismeer, which was glittering in the sunshine and still wearing its Christmas dress of pure white snow. We left the glacier by the Stieregg. The hillside was tolerably steep; it was covered, too, with soft, deep, powdery snow, and the higher we went the deeper it seemed to get; indeed, on one or two of the slopes overlooking the great ice-fall an avalanche might have been easily started. Matters improved, however, when we took to the upper portion of the glacier, and we reached our night's lodging long after dark, it is true, but with every prospect of a fine and, as we hoped, successful day on the morrow.

The next morning at 4.30 A.M. we all left the hut, Mr. de Carteret with his guides for the Schreckhorn, and our party, consisting of Ulrich Almer, Johann Kaufmann, Mr. Emil Boss, and myself, for the Strahlegg and Lauteraarhorn. It was a keen, frosty morning, without a breath of wind, the whole glacier glistening in the moonlight as if strewn with countless diamonds; it was just a fairy ballroom, and I much wonder whether we rough mortals had any right to trespass there and soil it. We went quickly along, for it was too cold to linger; the snow was good and hard, holding the usually loose stones in their proper places, and without any trouble we reached the top of the Strahlegg just as the day was breaking.

The scene was very grand, as it always is, but the sun had not yet risen to soften the rugged outlines of the surrounding peaks, and the pass in the early morning light looked strangely weird and desolate; breakfast, too, was a really cold collation, and very glad one at least of the party was to start again. We found the ice-wall in perfect order, hardly any steps requiring to be cut, and before we could say we were even getting warm we found ourselves on the level Strahlegg Firn heading at a half run for some rocks descending southward from our peak. By these rocks a great part of the ascent was made; they were quite easy, with very little snow upon them, and gave good, firm foothold. By this time, too, the sun was fully doing his duty, and the change from the intense cold on the Strahlegg to the present warmth was most acceptable. Then for a time we found ourselves in a narrow snow couloir. It was steep, but the snow, as every-

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where else, was in excellent order. It ended under some more rocks, where we made a short halt for lunch, and by them soon afterwards reached a very small snow col, most likely in the summer conspicuous by its absence. Then turning slightly to the left we struck the final arête about half an hour below the summit. Truly a golden staircase, for the rocks were not only free from snow or ice but were covered with the bright yellow lichen that we somehow associate only with hot summer days.

Our arrival on the top was greeted by distant cheers, and looking towards the Schreckhorn we saw our companions of the morning part way down the arête on their homeward route; then we turned to the view. It was beautiful, but perhaps a little severe, for both the Finsteraarhorn and Schreckhorn being so very near were somewhat overwhelming, and the Lauteraar glacier, with the more distant lowland view, looked in the light of this winter day very grey and lonely. But across the Rhone valley all was sunshine, with a glorious peep of the Matterhorn, Weisshorn, and Mischabelhörner standing clearly out against the bright sky; many smaller hills, too, almost unnoticed in summer, were changed by their winter garments into most respectable snow-clad peaks. Very reluctantly we turned away to begin the descent; but it was time, the day was getting on, and we were very far from home, so when at the foot of the arête a most tempting snow couloir opened out, we embarked gladly on it, and by a series of really good glissades reached the glacier in about an hour and a quarter after leaving the top; then hurrying on were over the Strahlegg before the darkness came or we needed to take to our lanterns.

The night was again spent at the Schwarzegg hut, and we started the next morning—well, not too early—for the second peak, a very little one. It was only to be taken as a means towards an end, in order to cross to the upper slopes of the Grindelwalder Viescher Firn, thereby making our way to the Bergli hut by passing close under the Vieschergrat. Poor little peak! I really do not know what to call it, and can only think that its sponsors must have quarrelled about its name on the way to the christening. It has a little stone-man of its own, also a bottle, and the cards of a few, very few, visitors; it is hard upon it that it can only be mentioned as a number; but so it is, being one of the two points marked 3,121 and 3,360 mètres on the new Swiss map (Siegfried); perhaps the latter.

Two short hours of easy going on the snow by the East

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arête landed us with (for this day only) a 'luge' on the top, and there our sorrows began. The day was not good, clouds had been gathering for some little time, and when we reached the aforesaid stone-man there was an unmistakable look and feel of snow in the air. We waited for what seemed to be a very long hour to see if things would improve, no one thinking the Bergli hut quite equal in comfort to the Bär hôtel, especially in a snowstorm. Then, putting off the evil hour of decision as long as we possibly could, we began the descent by the rocks on the north side, bearing down to the slopes of the Viescher Firn. These rocks were a little troublesome. They were rotten with the snow resting on them in a soft, powdery state; several times, too, we had to retrace our steps a little to find a better or more solid way down. However, it was a little variety to what was otherwise an uninteresting and rather disappointing day. When we reached the glacier the weather had certainly not improved, and a little fine snow was falling, besides which we got an occasional glimpse of Grindelwald through the clouds, and suddenly a great longing for the luxuries there to be found fell upon us. The downward path, too, looked very tempting, and I do not think we even made the smallest stand to decide upon our route, but in a very short time we found ourselves in the Zäsenberg hut, making a large and most welcome brew of tea before hurrying down the Eismeer with most decided views as to dinner and sleep.

Then came an interval of three days which was devoted as before to 'luging,' but we were obliged to transfer our affections to the high road. Our own particular runs were in a shocking state of disrepair for want of fresh snow, the water jump had become a wide, rapid stream, and the plunge a thing of the past, the lord of the manor having stacked his firewood in front of it. Our beautiful snow-lady, too, had completely lost her head, I think also an arm.

On January 10 we were again *en route viâ* the Zäsenberghorn and Viescher glacier for one, perhaps two nights, at the Bergli hut, with the deepest laid schemes concerning the Jungfrau. We found the snow everywhere good, and the crevasses, although large, few in number; but on some of the steeper slopes and at one or two awkward corners steps had to be cut; the porters, too, took their own good time, consequently it was late when we arrived there.

Our good intentions made overnight for an early start up the Jungfrau came, as such things sometimes do, to an untimely end. We overslept ourselves, and by the time we

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were ready to move had resolved upon a shorter day—either the Mönch or the Gross Viescherhorn. We quickly decided in favour of the latter, for we knew it had never yet been ascended in the winter. With carefully made steps for future use we crossed the lower Mönch Joch on to the Ewigschneefeld, and then in truth a surprise and pleasure was waiting for us: it was as hard and firm as any well-laid floor! There was no longer any occasion for those muttered remarks so common to the place, the full meaning of which it is better perhaps not to inquire into too closely, nor for that utter silence telling so plainly the thoughts then passing through one's mind. No, it was a dream of beauty and delight.

We went cheerily along until we were well in front of our peak; then, turning to the left, ascended some long but very easy glacier slopes, made a short halt for our second breakfast, and, crossing the very small bergschrund to a short slope of snow, reached the foot of the rocks a little to the left of the S.S.W. arête by which the remainder of the ascent was made. These rocks were somewhat steep, hidden in part by snow and in one or two places made a little awkward by a glaze of ice, the first we had met with, but it was only enough to suggest some extra care, and without any real difficulty we followed them until we turned on to the actual edge of the arête about a quarter of an hour below the summit.

We stayed there a long time, far too long, indeed, for any chance of reaching the Bergli hut again by daylight, but it was a scene not to be forgotten. There was the magnificent group of the great Oberland peaks, beginning with the Finsteraarhorn almost within touch and with the Eiger and the Schreckhorn parting it in the centre by a Royal Gateway, through which a glimpse of the quiet chalets and meadows of Grindelwald could be caught. Then to the south there was the well-known Pennine chain from Monte Leone to the far-away Mont Blanc, with not a cloud to dull the outlines. One missed the beautiful Weisshorn, hidden as it was behind the huge mass of the Aletschhorn; but one cannot have everything in this world, and what we had then before us was more than worth the journey out from England to see. With a view of repeating our tactics on the Lauteraarhorn we looked before beginning the descent for a convenient slope for a glissade. It was found on the face just below the summit, so after most cautiously going down some little distance in steps somewhat resembling soup-tureens, and then finding that all was right, we let ourselves go, and in a

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little more than half an hour after leaving the top found ourselves again on the glacier, with our second knapsack—well, not quite empty—beside us. Our return to the Bergli was otherwise uneventful.

On January 12 we were up early; no more oversleeping, for there was some housemaid's work to be done before closing the door, as we hoped, for the last time. Then retracing our steps by the cheerful light of a lantern as far as the Lower Mönch Joch, we turned to the right and were over the ridge running between the Mönch and Trugberg before the day had shown much sign of breaking. We went along the glacier close by the foot of the Jungfrau Joch, with the Kranzberg well away to the left, and made for the hollow between it and the Jungfrau. The sun had by this time risen, but it was very cold, and we were not at all sorry to begin the ascent of the steep snow slope directly under the well-known bergschrund and Roththal Sattel. But the higher we went the lower sank our hopes of success. Some time before we had noticed that the Mönch was indulging in a morning pipe, but that we tried to persuade ourselves was only due to some local current. Now, however, there was a most persistent roar among the rocks on our right hand. Was the said local current making itself at home there, or did it extend higher up? We would soon find out, and find out soon we did. We had gone quickly up the slope, for hardly any step-cutting was required, and it was still very cold. We had also made a great pretence of difficulty in crossing the diminished bergschrund, but it was only when we reached the Sattel that we met our cruel enemy face to face. It was blowing half a gale, blowing, it seemed to us, from every quarter at once, and it was only by crouching down on the snow at every blast that we managed to cross the Sattel and ascend even part of the way up the short slope leading towards the lowest ridge of rock overlooking the Roththal. Thirty, perhaps thirty-five, steps alone separated us from it, and there were distinct marks of old ones the whole way across, but they would have to be cut out again in the hard ice, and in the very teeth of the gale. Almer set to work at once and succeeded in clearing three or four of them, then Christian Jössi, our second guide took his turn, then Mr. Boss, and for nearly three hours they fought desperately against the icy wind without getting even half way to the rocks. They gave in at last, but most unwillingly, and we turned back. Oh the bitter disappointment! We could see that the rocks were perfectly free from snow; the

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flagstaff on the top, too, was plainly visible in the sunshine, and a very short time would have taken us there if only the wind would have lulled a little. Of course it was then too late in the day to think of crossing, but from the summit we could have seen something of what the north face was like, and that was almost half the work.

We were all half frozen, and our clothes as stiff as boards, so when we got down again to the bergschrund Mr. Boss suggested that it was about time for tea. So leading the way to a small ice cave under the rocky spur running down from the Roththalhorn, and producing from some mysterious pocket, first some small pieces of wood and then a kettle with a tin cup, he proceeded to make a cheerful little fire in a hole in the ice, and very soon some melted snow was boiling over it. Was ever afternoon tea made in such a place before? We drank it quickly, and after one more long look at the now distant flagstaff started downwards. The steps on the steep slope held well, and before very long we were again on the glacier, making for the Ober Mönch Joch as fast as the now rather soft snow would let us. Darkness fell as we crossed it; we lighted the lanterns; and in due time the four hungry, tired, and much disappointed mortals were back in the Bergli hut. Next morning we returned to Grindelwald, and it was certainly a black moment in my life when I was asked how we had fared, and had to answer that we had failed.

I could not rest; the disappointment on the Jungfrau was for ever in my mind, and with it the old tale of Robert the Bruce watching the spider make its seventh attempt to scale the cottage wall. I thought, too, of the many failures on the Matterhorn and the Aiguille du Dru before either of them was conquered. All this could have but one result. I resolved to try again.

The night of January 15 found us in our old quarters at the Bergli hut, with everything prepared for a good start the next morning. All promised well. It was very cold, but there was no wind; our old steps too served us again, and before very long we were up the steep snow and across the bergschrund on to the Roththal Sattel, with only the now easy ice-slope between us and the much-wished-for ridge of rock. Here we halted for our second breakfast, with some more wonderful cooking arrangements, and in a short space of time a hot beef steak was handed round, with tea to follow; so, fortified for the work that was before us, we went up the very easy rocks, then the last snow-slope (often a mere knife-edge

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in summer), and we soon stood on the top—a solid cone of ice. The view, as everyone knows, is lovely; it was on this day clear at all points but the north. We only allowed ourselves, however, a few minutes to admire it, and then, after exchanging friendly greetings with that most modest and retiring peak, the Dent d'Hérens, we commenced the much-longed-for descent.

We were soon down the rocks and ice-slope on to the large snow-field at their base, being helped in part by some old steps which only needed clearing out, and then we went along almost at a run, for we were anxious to save all the time we could. There was not the smallest difficulty; the few crevasses that were open showed no disposition to deceive whatsoever, and were quickly turned either to the right or left as the case might be. It was only on the last slope before reaching the rock arête leading to the Silberlücke that the axe was at all needed. Here, again, was a whole staircase of old steps, a souvenir of the past summer, and, while some of them were being merely cleared out and others entirely recut, it flashed across my mind that the original master hand had been that of Ambrose Supersaxo.

The arête when free from snow must be a perfect walk, not excepting the two last towers above the gap. We had to take it with perhaps a little extra care, devoting our energies to the often vain attempt of keeping either one or both feet out of some wily and unseen trap; but it was a change from the perpetual snow-fields, and did not delay us very much. We made a short halt in the Silberlücke (where a little ladder was quietly enjoying its winter's rest), partly for some half-frozen food, partly to look into the desolate Roththal; then, with a little more help from the axe of the long-departed Supersaxo, and an easy jump over the bergschrund, now shrunk to a mere nothing, we were on the Giessen glacier, running a mild steeplechase over its almost unbroken surface in the direction of the Schneehorn.

At the much-crevassed and broken part, near the Klein Silberhorn, we pulled up. We had no idea as to whether we should have any trouble in passing through it or not. Fortune, however, still favoured us; caution only was necessary, and soon again we were urging our wild career.

It was needful; the light was beginning to fade, and we had still before us the descent of a steep face of rock, with the way afterwards to find through the great ice-fall down on to the Guggi glacier. The cornice, too, on the Schneehorn might give us trouble (it did somewhat) and it took

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some time in the failing light to find a safe place where it could be cut through on to the face of snow between it and the rocks beneath.

Oh! the weary descent of those rocks; they were not only very steep and very rotten, but were much covered with snow in the worst possible condition, and the utmost care was needed to prevent a slip. To make matters even worse, it was by this time quite dark, one of our lanterns obstinately refused to keep lighted, and our only remaining hope had to be continually passed from hand to hand to enable the one person then moving to see where the next step might be.

We were all glad to reach the plateau on which the routes from the Jungfrau and the Jungfrau Joch join, but were getting very anxious about our chance of passing through the ice-fall in the darkness. One lantern can only light up a short distance in front, and the only other thing we had to depend on was a large torch, used, I think, for signalling; this would burn brilliantly, it is true, but for just one half-hour. How we searched for that outlet! first about the middle, then a little to the left, and back again to the centre, then on to the right, but without any success. Another long reconnaissance to the left, then a still longer one, as far as the light of the torch would take us, to the right, but it was of no avail. Finally, returning to the spot we had first started from, Mr. Boss led the way through an arched entrance, and down an inclined plane, into an ice cavern, below the level of the glacier, and said that we must now wait for daylight. It was not exactly the most cheerful prospect, for we were tired and hungry. Our larder, too, was scantily furnished; a very little bread, a small piece of cheese, a few raisins, and a little brandy was all we had—wait, I think I remember seeing also a chicken bone. We could keep ourselves warm though—the cave itself did not feel very cold, and we had with us a large opossum rug, with some other warm garments, so things might have been worse. The cavern was very beautiful; it was divided into two long and narrow chambers by ice pillars, which gradually closed at the far end into a wall; icicles of all shapes and sizes hung from the roof and sides, and the whole place glistened in the light of our faithful lantern. We dug a hole in the snow, carpeting it with the empty knapsacks, and using our axes as seats. We dined sumptuously on cheese and raisins (leaving the bread for breakfast); then, putting on every available warm wrap, prepared to get through the

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night as pleasantly as we could and to make the best of a bad bargain.

Five minutes in the daylight next morning was quite enough to find the long-sought-for chimney—it was hardly twenty paces from where we had spent the night—I think we had been actually on it, but it was so narrow and so much covered by a projecting headland of ice that it was small wonder we had missed it in the darkness. We went down it one by one on to the *débris* of some recently fallen séracs, through which we hurried, meeting on the way two of our old guides, who had come up from Grindelwald the previous afternoon to give us extra help, if necessary, and who, not being able to find the upward path, had spent a much more uncomfortable night than ours in prowling round and round some large blocks of ice.

In a short time we were over the Guggi glacier, all the difficulties behind our backs, and with nothing between us and the Wengern Alp but the tail of the Eiger glacier, its moraine, and the well-known grass slopes beyond, all thickly covered with snow. It is needless to say that we did not linger.

This, my most lame and imperfect tale of our winter wanderings in the High Alps, is now finished, finished too on the anniversary of our first start. How vividly it has brought the whole scene again before me! It was a new experience, but to me a most enjoyable one. All the disagreeables seemed to be in the first 10,000 feet, and from the same cause—deep, powdery snow; higher up they vanished. The cold too was sometimes very severe, especially so directly after sundown, but the pleasant and just sufficient warmth of the sun was most delightful, and when combined as it generally was with firm rocks and good hard snow more than compensated us for any of our earlier troubles. Perhaps we had exceptionally fine and settled weather. I cannot tell. This, however, I do know, that there is just one little cloud to dim the brightness of it all—the thought that never again in any of my future wanderings will I meet the man, who by his great experience in winter climbing, and his unceasing efforts to make all things easy for me, contributed so very much to all our success. I mean Mr. Emil Boss.

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A Week amongst French Dolomites.

By FREDERICK GARDINER.

THE town of Grenoble is spoken of by Mr. Ball, in his 'Alpine Guide,' as being one of the most beautifully situated of European cities, and after a fairly familiar acquaintance with it during the last fifteen or sixteen years I think my friend Mr. Coolidge and myself are quite prepared to endorse his opinion. Grenoble is the starting point for many places of interest, whether the Grande Chartreuse, with its lovely forests and famous convent, or the splendid glacier regions of Upper Dauphiné, or the sanctuary of Our Lady of Salette, or bathing places such as Uriage, La Motte, and Allevard, or the wonderful limestone district lying west and south-west of the town, the weird and fantastic mountains of which form the western ramparts of the Alps, and may, by reason of their geological peculiarities, not inaptly be called the Dolomites of France.* I met Mr. Coolidge in the beginning of September 1888, at our old rendezvous, St. Michel de Maurienne, and after a fortnight in the Grandes Rousses, Oisans, and Val Gaudemar districts, we arrived at Grenoble on September 17, having been fairly fortunate in our weather, considering the very unsettled state of the weather during most of the mountaineering season of 1888. Our plans were to explore the districts (hitherto almost untouched save by Mr. Coolidge) of the Vercors, the Royannais, and the Dévoluy. (I am speaking, of course, of English travellers, as the Royannais district, especially, is much visited by tourists both from Grenoble and Lyons.) Christian Almer, the younger, who had been with Mr. Coolidge all summer, did not accompany us, but we had old Simon Barnéoud, of Vallouise, my faithful porter and companion of many past seasons. Our first day

* I may mention in this connection that the Marquis de Dolomieu (born 1750, died 1801), who in 1790 practically discovered the mountains in South Tyrol which now are known as 'The Dolomites,' lived at Dolomieu, which is situated at a distance of five miles from La Tour du Pin, about half-way between Lyons and Grenoble, and is forty miles from the district which I have ventured to call French Dolomites. There are Tyrolese Dolomites, and there are Swiss Dolomites. Why, therefore, should the description not be used in France for mountains whose geological formation justifies the name, and which are situated almost within sight of the home of the *savant* from whose title the name has been coined?

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(September 19) was entirely by carriage, and took us from Grenoble to Pont en Royans viâ Villard de Lans and the wonderful gorges of Engins, and of Les Grands Goulets. The diligence started for Villard de Lans at 6 A.M., but the season was already so far advanced that it did not go farther than that village, which is, roughly speaking, about half-way to Pont en Royans. Crossing the fruitful valley of the Isère to Sassenage (the present resting-place of the celebrated Lesdiguières), a steep road passing through limestone gorges led us up to the fertile valley, or rather tableland, of Lans, in which the village of Villard de Lans is situated at a height of 2,710 feet above Grenoble. The scenery so far had not been of a very remarkable nature, but nearly all the way from Villard to Pont en Royans it presented a most extraordinary series of limestone gorges in the gigantic cliffs towering above, the whole forcibly reminding me of the pictures I have seen of the cañons of North America, though, of course, on a smaller scale, and not so gorgeous in colour. Trees, consisting principally of beech and pine, are everywhere abundant, and exist wherever they can hold on. The most remarkable spot in the day's journey was the entrance to the Grands Goulets, where the gorge is so narrow that there is barely room for the carriage road and the stream, so that in places the road is carried over the edge of a precipice on short iron bridges, while here and there 'head room' has had to be hewn out of the side of the gorge itself. Lower down, the gorge widens out into a valley of some breadth, remarkable for the quantity and luxuriousness of the box-tree, which I have not hitherto seen in any great quantities in Alpine regions. At one place, apparently the house of the local curé, the box-trees had been cut into quaint shapes, after the Dutch style. Further on, the valley again contracts into a narrow gorge (les Petits Goulets), very grand, but of comparatively small dimensions as compared with the upper one. On emerging from this we shortly reached the village of Sainte Eulalie, and in half an hour arrived at Pont en Royans, a wonderfully picturesque village, or small town, perched on both sides of the entrance to the rival gorges de la Bourne, and connected by a bridge high over the stream. I can scarcely exaggerate the extreme picturesqueness of this place: the houses are shored up from below, and rise tier over tier on the side of the gorge with one narrow main street running through them. In passing along this street to our inn, we noticed that we were on a level with the roof of the church, which was situated immediately below us,

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while on the other side we were overshadowed by the tall houses; in fact, the whole place looked as if it were stuck on to the hillside limpet fashion. Pont en Royans may be described as the extreme western doorway to the Alps, as immediately to the east rise the fantastic limestone crags of the 'French Dolomites,' while to the west the fruitful hill country and plains of the Drôme spread away towards the Rhone. Fresh trout is the great specialty of Pont en Royans: one inn we saw had the sign 'Hôtel de la Truite Fraîche,' while in a conspicuous position at the Hôtel Bonnard fils, where we put up, 'messieurs les gourmets' were informed that fresh trout were to be had and served at any time, and upon the shortest notice. Grenoble may be reached in a couple of hours by rail from the station of Saint-Hilaire Saint-Nazaire, to which omnibuses run in correspondence with the trains, so that the wonderful gorges may be seen in one day out from Grenoble, starting very early and returning very late, a most interesting excursion, which I can highly recommend.

At daybreak next morning we left Pont en Royans, and, retracing our steps through the gorges of the Goulets, reached the upper entrance to them. They seemed almost more wonderful under the early morning light of a lovely autumnal day than on the previous afternoon, and were well worth a second visit. From the inn at the entrance to the gorge we proceeded along the road through the village of La Chapelle en Vercors to St. Agnan, where we lunched. Our destination was the village of Gresse, which is situated N.E. of the Grand Veymont, and lies at a short distance from its foot. Immediately above St. Agnan to the N.E. there is a large forest, through which we had to pass, beyond which lay a dry and desolate tableland, with the low range of limestone peaks culminating in the Grand Veymont between us and our night quarters at Gresse. This forest, which is very dense, and covers an immense tract of country, is said to contain more bears than any other district in France. Judging from the map, there are springs here and there, but otherwise it is quite destitute of water, and we saw no running water from the time we left St. Agnan until quite close to Gresse. We should, indeed, have fared badly in that respect had it not been for the kindness of a 'garde forestier' we met, who not only gave us water, but set us in the right path for Gresse, which we had lost among the bewildering tangle of forest paths; for the trees were so high and thick that we had great difficulty

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in ascertaining our exact position. A good path leads up the hillside from St. Agnan to the great plateau for about 2,300 feet, and so far our way was clear enough: it was beyond that, where the paths diverged in so many directions, that our troubles began. It was nearly 4 P.M. when we at last emerged from the forest and saw the peak of the Grand Veymont rising beyond a wilderness of stones, as well as the Pas de la Ville, the pass we had to cross to reach Gresse. We put on steam, however, reached the pass at 5.10 P.M., and literally raced down on the other side, as we were almost frantic from want of water, and were, besides, anxious to get in before it got quite dark, which we just succeeded in doing. At Gresse (3,950 feet) we were most hospitably received by a delightful old landlady (the Veuve Mouttet), who did her very utmost for us, so that (considering the district) we were comparatively well lodged and fed. She was very curious about us, asking many questions, and had very vague and old-fashioned ideas as to our nationality. I quite won her heart by presenting her with a small medal I had purchased at La Salette, and the bill next morning was so moderate as to be almost absurd. Coolidge declared that my gift to her was a diplomatic action with that end in view—a most vile aspersion, which I shall not take the trouble to refute. The Grand Veymont, as seen from Gresse, is grand indeed, being formed, on this side, of immense precipices and jagged towers of limestone rock, looking curiously like one of the great Dolomite peaks. It is the loftiest point of the Vercors, being 7,697 feet high (rising 3,700 feet above Gresse), and although perfectly easy to climb when taken from the Pas de la Ville, I think it would puzzle the best of cragsmen to tackle it direct from below. Starting as soon as it was day next morning (Friday, September 21), we returned to the Pas de la Ville after a quick steep climb, and, keeping more or less near the N. arête, arrived on the top without difficulty in $2\frac{3}{4}$ hrs. walking from Gresse. The day was fine, and we were rewarded by a splendid view, embracing the wonderful forest and plateau we had crossed the day before on the one side, and the great Dauphiné mountains on the other; but by far the most extraordinary feature was the marvellous Mont Aiguille (6,880 feet) below us, with walls all round steep as a house, though it is flat at the top, which is covered with grass and a few trees. The Mont Aiguille is, I believe, really a detached portion of the great plateau, and has been justly termed one of the Seven Wonders of Dauphiné.

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The history of the Mont Aiguille is perhaps more singular than that of any peak in the Alps, or, one might say, it is as singular as its shape and appearance. In 1492 (the same year that America was discovered) one Julien de Beaupré, Chamberlain to the King, by order of Charles VIII. of France, and in order to comply with what (at that period at any rate) must have seemed a remarkable whim on the part of that monarch, ascended (June 26) the 'Eguille,' or, as it was locally called, the 'Mont Inaccessible.' Julien de Beaupré was accompanied by a number of followers, and made the ascent by the aid of ropes and ladders. I venture to give a condensed account of the wonders seen by the party: 'On June 26, 1492, I, François 'de Bosco, almoner to the said Seigneur Julien de Beaupré, 'in company with other hardy adventurers, ascended the 'Mont Eguille, or Mont Inaccessible, and the day following, 'having said Mass on the said mountain, ate, drank, and 'reposed thereon. The Seigneur Julien de Beaupré changed 'the name of the mountain from Eguille, or Montagne 'Inaccessible, to Eguille fort, causing it to be solemnly 'baptised, in the name of the Holy Trinity, by a certain 'Sébastien de Carect, one of the royal chaplains, and after-'wards chanting the Te Deum, Salve Regina, and many 'other anthems.' They remained six days on the top, which de Bosco said consisted of a lovely meadow. He also tells of 'une forte belle garenne de chamois,' which, he further adds, could never leave the summit. If they ever got there at all their imprisonment would scarcely surprise anyone who has seen this wonderful mountain. Many wild sparrows of three different colours, red, black and grey, ravens with red feet, and other extraordinary and unknown birds, as well as lovely flowers, some of a hitherto unknown kind, are among the wonders described. They built a hut, and planted three crosses, one on each of the three highest points; but, as he remarks, the mountain which was horrible to ascend was still more terrible to descend. The next ascent one hears of was made on June 16, 1834, by one Joseph Thiollier, curé of Chichiliane, a village close by, and Eugène de Rochas, avocat, of Gap, accompanied by some local men, and with the aid of ropes and ladders and masons' hammers. After considerable difficulties they reached the top, and found the lovely meadow described in the account of the ascent of 1492, but no traces of animals, either living or dead. On the highest point they found what seemed to be the fragment of a stone wall, probably the

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remains of the hut built by Julien de Beaupré. They also were immensely impressed by their experiences, and speak of the Mont Aiguille as one of the seven wonders of Dauphiné. The first ascent by a tourist was made in 1877 by Monsieur E. Rochat, who found on the summit a small iron cross, with the record of an ascent made, on July 28, 1849, by one J. Mouttet and two men from Gresse. In 1878 the Section de l'Isère of the French Alpine Club had chains placed in the most difficult parts of the mountain, which were renewed in 1880. This mountain has been frequently ascended by M. Felix Perrin of Grenoble.* The depth of the fissure by which it is separated from the great tableland is, according to the map, about 450 mètres (1,329 feet). 'Joanne' says that the ascent requires five hours and a good guide, and states that it is an expedition he recommends to nobody. Coolidge sends me the following notes of his ascent on August 29, 1881 †:

After waiting several days at Clelles, and making one attempt, which was defeated by bad weather, I started at 6.5 with young Emmanuel Ferrat, the son of the landlady of the Hôtel de la Gare. We followed the path of the Donnière valley (to the south of the peak) as far as the hamlet of La Richardière (halt 7.5–7.10), and thence making a great détour mounted to the base of the S.W. corner of the peak. After a halt for breakfast (8.45–9.30) we started off again along the base of the mountain for ten minutes, and then began the real climb. The way lies through several deeply-cut fissures, or, rather, hollows of the most extraordinary nature. At one moment we seemed to be in the very bowels of the mountain in a great cavern, whither scarcely any light penetrated. The rock is very smooth, and bad to climb, so that I was glad to avail myself of the iron chains, of which there are five in eight bits, one being broken at that time. At 10.45 we gained the upper plateau, which is really quite an extensive sloping grassy meadow, with at least one stunted pine tree, and many flowers. In ten minutes more we gained the iron cross planted in 1849. The view was most splendid, taking in on the north all the Dauphiné peaks, beyond which rose the Grandes Rousses, Belledonne, and Mont Blanc himself. To the south the higher ridge of the Grand Veymont limits the view. Most wonderful of all was it to look down the sides of the huge block on the top of which we were, for they seemed one sheerer than the other, while Clelles and the railway were at our very feet I seem to recollect the remains of a stone erection, which I identified with the hut built in 1492, but I can find no mention of them in my notes, and the recollection is probably a mere fancy. We spent two hours roaming about

* See his detailed narrative in *Annuaire du Club Alpin Français*, 1878, pp. 630-6.

† See *Alpine Journal*, vol. x. p. 347.

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the meadow, and started on the homeward journey at 12.55. We regained the base of the peak at two, then skirted along it as far as a spring at the N.E. corner of the peak, where we halted from 2.20 to 3.10, regaining La Richardière at 3.45, and Clelles at 4.45, after one of the most curious and interesting ascents I have ever made. I was quite satisfied with my young guide, who asked 25 francs for the expedition, a fee which seems rather high until one remembers how absolutely essential local knowledge is to anyone who does not know the one well-hidden and intricate way which has yet been discovered to the summit of this freak of nature.

Following the S. arête of the Grand Veymont in its entire length, we made for a green oasis near the Pas de la Fouille, where we had seen some mules grazing, in the hope of finding some water, of which we were sorely in need, but we were doomed to disappointment. We then crossed the Pas de la Fouille, fairly scorched by the intense heat reflected from the dry limestone rocks; such drought and barrenness I have rarely seen. At last, to our intense delight, in crossing a tiny gully Barnéoud espied a small trickle of water, which we flew to with delight. After a descent of 2 hrs. from the summit of the Grand Veymont, we reached the village of La Bâtie, where we took a rest and wasted an hour pleasantly, wondering all the time at the extraordinary effect the Mont Aiguille presented as seen from this point—more like a paper-knife set on edge than anything else I can think of. The Grand Veymont from this point has also a very fine appearance. Our destination was the village of Clelles, on the railway which runs over the Col de la Croix Haute, between Grenoble and Gap, and in order to reach it we had to cross the little Col de Trézanne, at the foot of, or rather skirting the base of, the Mont Aiguille. It only involved a rise of a few hundred feet; but to take a pass in the afternoon after a peak in the morning is a proceeding I always detest. However, it had to be done, and the changing views we got of the Mont Aiguille formed a redeeming feature throughout. We had some little difficulty in finding our way through the beech-trees on the S. side of the pass, but after reaching Trézanne we followed a good mule road to the railway viaduct which crosses the entrance to the Val Donnière. Passing under it we reached the high road, and soon afterwards Clelles, where we were comfortably entertained at the little inn (Hôtel de la Gare) near the railway station. From Clelles the Mont Aiguille is very conspicuous, but it had not the weird appearance it presents from the Col de Trézanne or the top of the Grand Veymont.

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Saturday was a mixed day of travel. We began by going in the train to St. Julien en Beauchêne. Here I may remark that St. Julien remains, but unfortunately the 'beaux chênes,' from which it is popularly said to take its name, have disappeared. As, however, the name can be proved by documents * to be taken from the stream in the valley, the Büech, this matters little. From there we ascended the charming valley of Durbon, to visit the ruins of a Carthusian monastery (founded in 1116), from which the monks were expelled at the time of the Revolution. The buildings have been suffered to fall into decay, and little now remains except the four walls. From the monastery we crossed the little Col de Rioufroid, and so reached the valley of Rioufroid, from which we descended to Lus la Croix Haute, a picturesque village. We arrived at the rough country inn, chez Armand (Café de la Poste), opposite the church, just in time to escape a shower of rain. The evening set in wet, and torrents of rain fell during the night.

Next morning (September 23) the weather had somewhat cleared at daybreak, and although threatening we decided to start for the ascent of the Grand Ferrand (9,085 ft.), the second peak of the Dévoluy district, than which there is said to be not a poorer region in the whole of France. This we could well believe, for a more sterile country I have rarely seen: limestone rocks everywhere, scanty soil, and, like many districts in the W. and S.W. Alps, entirely overgrazed by sheep. It seemed to us very sparsely inhabited: I suppose it would scarcely support more inhabitants. Another undesirable feature of this district is the number of wolves it contains in the forests above St. Disdier: there are said to be a greater number than in any other part of France. The rivers and streams in this district in fine weather are most insignificant, but owing to the nature of the limestone rocks and the rapid manner in which the water runs off and through them, a few hours' heavy rain and a sudden storm will turn these innocent-looking streams into fierce torrents which devastate all the lower parts of the valleys and almost convert the district into a wilderness. It is indeed a poor country, although highly interesting to the traveller from the very picturesqueness of its ruin and the wonderful and fantastic forms of the limestone rocks and precipices. Leaving Lus la Croix Haute at 6.15 A.M. we drove for 1¼ hr. along the Büech valley

* See the different forms of the name, ranging from 1135 to 1575, collected by Monsieur J. Roman in his valuable *Dictionnaire Topographique du Département des Hautes Alpes* (Paris: 1884), p. 11.

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in a rough country cart as far as the foot of the Col de Charnier, which we had to cross before attacking the Grand Ferrand. A rough sheep track leads over the col, to which we mounted rapidly, as the weather became more and more threatening and we were anxious to get a view on the other side, as we had no local knowledge and had only the map and some notes to guide us. We fortunately got a view before the clouds descended, but not a very satisfactory one. Crossing over ridges of rock and sharp *clapiers* of limestone (which cut our boots and tried our tempers sadly), we reached the base of what we thought was the highest peak, which we proceeded to climb from the Crête de l'Etoile. Much to our disgust, we found ourselves on a lower, though cairn-crowned point, the highest peak being some way off, and round its top a storm of wind and hail already raging. We had no time to lose, so rushing down the slope towards the main ridge we attacked the main peak and were soon enveloped in the storm of hail, rain, and wind. We almost flew up the peak, being most anxious to climb it in spite of the weather, and momentarily fearing that we should be driven back, taking note of the main features of the ridge meanwhile so as to guide us on our return. I need scarcely say that our stay on the top (crowned by several diminutive stone men) was of short duration, but we were fortunate enough to get a glimpse of the view through a break in the storm, and to satisfy ourselves that we were really on the highest point. We had abandoned poor old Barnéoud on the way up. As we had climbed the mountain against time, he had not been able to keep up with us; and as we had been absolutely swallowed up in the mist he had not a very clear notion as to where we were, while the noise of the wind was too great for a "jödel" to reach him. We managed to retrace our steps without mishap in spite of the mist, and near the point where we had left the false peak for the arête of the true one we chanced upon him. He looked like a deserted hound, giving vent from time to time to a feeble howl or 'jödel,' hoping to attract our attention. He was unfeignedly glad to see us return all right. Then, joining forces, we made for a cave we had seen on the way up, where we were sheltered from the weather and made a good meal, of which we stood in need and which we much enjoyed in spite of the absence of water to drink, which was a certain drawback; but 'que voulez-vous?' as Barnéoud philosophically observed: 'if we wanted water to drink, the Dévoluy district was not the

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place to come to for it;' it certainly was a great hardship, as the wine we had taken from Lus was, to me at any rate, an impossibility. The rest of the day the weather continued very stormy, and after leaving our cave we descended some way down the valley des Adroits, and turning due S. over a little col leading to the villages of Maubourg and La Combe, reached the village of Agnières, situated on the high road which runs due N. and S. between Corps and Veynes. We found the inn very uninviting, and so determined to proceed to St. Etienne en Dévoluy over the Col de Giers, expecting to find better accommodation. On our arrival there, just before nightfall, we inquired for and found the chief village inn, where the landlady, after eyeing us suspiciously, said very abruptly, 'The beds are engaged.' I then asked her, in some dismay, where we were to seek accommodation for the night; she replied contemptuously that perhaps they might let us in at the hospital opposite!! Would she at least cook some supper for us? we were willing to pay. 'No, she would not;' upon which she turned upon her heel and left us staring somewhat blankly at each other. It was quite a new experience. Both Coolidge and myself have visited more out-of-the-way places in the Alps than most men, but we had neither of us hitherto found ourselves in a spot where the natives 'against the houseless stranger shut the door.' I imagine she thought that we were Piedmontese workmen, who were not good customers; certainly nothing could be more draggled or disreputable than our appearance. Shortly before entering the village we had noticed a most miserable cantine, apparently of the poorest type (Auberge Marcellini), to which we retraced our steps in the lowest possible spirits; but fortunately we met here with an entirely different reception. The hostess gave us her own supper, which merely consisted of some garlic-flavoured mutton and dry bread; but we were so thankful to get food and shelter in this inhospitable region that we actually enjoyed it. Heavy rain during the night and early morning caused us to abandon our intention of ascending the Pic de Bure or Aurouse (8,898 feet), so we determined to descend to Corps and finish our mountaineering for the season. Anything more desolate than the valley of the Souloise between St. Etienne and St. Disdier I have never seen. The devastation on all sides and the almost absolute sterility are something to be seen, not imagined. The position of St. Etienne itself is comparatively fertile, and the basin in which it is situated is cut off from the lower valley by an impressive gorge, through which the

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road has been cleverly engineered and in part tunnelled. At the village of St. Disdier we got a charrette and a most obstinate mule to drag us to Corps, which it did in a most leisurely manner, protesting violently with its heels over the splashboard when the driver urged it forward. As the road was extremely narrow, in very bad repair, and often overhung precipices in a narrow gorge, the effect upon our nerves was most trying, so Coolidge and myself walked a considerable part of the way, but Barnéoud, to whom riding in a vehicle of any kind was a dignity and pleasure, apparently under any circumstances, stuck to the carriage like a man. From St. Disdier to La Posterle, about halfway, the road is extremely picturesque, the rocks on either side rising up in true fantastic Dolomitic forms, until we reached the main valley of the Drac. Just before nightfall, and in pouring rain, we arrived at Corps, a village (under the shadow of the Obiou —9,164 feet—the highest peak of the Dévoluy, climbed by Coolidge on August 31, 1881 *), where we had been ten days before on our way to La Salette. Next day we returned to Grenoble *viâ* La Mure and the new railway between La Mure and St. Georges de Commiers, the latter place being a junction on the main line between Gap and Grenoble. The manner in which the line turns and twists in the descent, and finally overhangs the precipices above the river Drac, is something appalling, and that short railway journey was certainly to be considered as one of the many strange experiences we had passed through during our week amongst the French Dolomites.

The Growth and Sculpture of the Alps.

By Prof. T. G. BONNEY, D.Sc., F.R.S.

(The Tyndall Lectures for 1888, delivered at the Royal Institution, London.)

No. 3.†

It is now twenty-six years since Sir A. Ramsay attributed the excavation of many, perhaps I may say of most, lake basins to the erosive action of glaciers. He applied this explanation not only to the numerous lakelets of Scandinavia, Canada, Scotland, and the mountain

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* *Alpine Journal*, vol. x. pp. 347–348.

† Some introductory remarks are omitted in which the author indicated that the erosive effect of glaciers must needs be considered before discussing the history of the minor structural features of the Alps, and expressed regret that on this point he was obliged to differ from Professor Tyndall.

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districts of Britain, but also to the lakes on either side of the watershed of the Alps. Indeed, his faith in the power of moving ice was evidently so strong that he was prepared to attribute to its action even the basins of the great lakes of North America, nor would it have been staggered by the mountain-like mass which must have been removed in the excavation of Lake Superior, a sheet of water with an area as large as Ireland.

The hypothesis was simple; it had also the fatal gift of brilliancy. It was seen, and it conquered. It swept away in its progress the majority of scientific workers. There was nothing which a glacier could not do; nowhere where it had not been. It could wriggle like a snake, it could root like a pig, it could transfer fragile shells unbroken from the beds of seas to the tops of mountains, and yet sometimes, merciful because strong, it could pass over loose materials without disturbing their peace, nay, even gather thick beds of *débris* beneath its protecting covering. But the hypothesis, like many brilliant tissues, has not been found to wear well. For myself, I began as a sceptic, and have ended as an unbeliever, on grounds which I shall endeavour to indicate as briefly as possible. It appeared to me about the year 1870 that the hypothesis could be tested most satisfactorily by a very simple though rather laborious process. This was to examine the valleys which either were known to have been or still were partly occupied by glaciers, and ascertain what excavating effects had been produced by the latter. With this end in view I examined the Lake region of the North-Eastern Alps; many of the more important valleys in the Central and Western Alps; and especially investigated almost all the district which drains down to the lakes of Orta, Maggiore, Lugano, and Como. The conclusions thus formed have been subsequently tested by numerous visits to the Alps, and I have seen no reason to modify them.* They may be summarised as follows:—

1. That at the present day, when the Alpine glaciers are advancing, their excavating effects are extremely slight; that the portions of their beds from which they have recently retreated show no signs of basin-like hollows on a small scale, but merely indicate a wearing away and a rounding of prominences, while in some cases the glacier has actually passed over *débris* without excavating it or great erratic blocks without removing them from its path.

2. That all down the valleys once occupied by glaciers a similar inability to do more than modify the form of projecting masses of rock is exhibited.

3. That in some cases where the ancient glaciers (as at the S. end of the Lake of Como, between that place and Camerlata) have passed over ridges of comparatively soft rock, they have not materially worn them away.

4. That tarns and lakelets are comparatively rare in the valleys leading down to the lakes, so that we must suppose that the glaciers neglected their opportunities during the greater part of their course,

* See, for instance, papers published in the *Quart. Jour. Geol. Soc.* for 1871, 1873, 1874, and *Geol. Mag.* 1871, 1876, 1877.

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and tried to make up for it by labouring energetically shortly before they disappeared—a state of things which is not without parallel in the human race.

5. That these upper valleys are not U-shaped, as they should be if excavated by a tool like a glacier, but exhibit the ordinary V shape, which is indicative of the erosive action of streams, as can be ascertained in districts where glaciers have never existed; yet it can be proved that these Alpine valleys have been but little altered in outline or depth since they were occupied by glaciers.

6. That the districts bordering these lakes on either side exhibit no exceptional features, but only those which would be found in any ordinary mountain valley if it were filled with water up to some contour line on its lower slopes, say a thousand feet or so above the present bed of the valley.

In addition to the above reasons, recent and more complete investigations of the contours of certain of the lake basins have shown that they cannot be reconciled with the above hypotheses. The American survey of the great lakes demonstrates that they can only be explained by the subsidence of an area which already formed part of a river system, and the old channels of the Rhine and the Rhone have been traced for some considerable distance along the beds of the lakes of Constance and Geneva respectively. Now, seeing that the greatest depth of the one is 905 feet, and of the other 1,096 feet, it is obvious that a sub-glacial stream would have had little or no excavating power on the bed, but must have flowed, if it flowed at all, between the ice and the rock, as if in a syphon tube. Moreover, some lakes, like Zug, Lugano, and certain of the Saltzkammergut lakes, are of considerable depth (Zug is 715 feet), yet are in positions where it is difficult to understand how glaciers can have had much power to excavate. The Achensee also, most difficult to explain on any theory, cannot be attributed to ice action, for its depth is asserted to be no less than 2,369 feet, the elevation of its surface above the sea in a comparatively secluded glen of the northern range of the Tyrol being only 2,946 feet—namely, about 1,200 feet above the bed of the Inn. Yet, if the old glacier of the Inn has done this work, it has been incompetent to remove the pre-glacial gravel over which it slid in order to gain the summit of the pass.

These reasons may suffice. I do not, however, deny that in certain special cases a glacier may have some excavatory power, and under favourable circumstances may be competent to produce a shallow rock basin like the tarns frequent in many mountainous regions. Still, I cannot suppose them to have excavated the greater Alpine lakes, or look upon them as agents of primary importance in mountain sculpture. They are, in short, as has often been said, the sandpaper and the files, rather than the chisels and the gouges of Nature. But having repudiated this theory, and admitted the justice of the objections offered by Sir A. Ramsay to certain others, I am bound to propose a better. Now I think we may safely assert that the Alpine lakes are very late in date. For instance, the pre-glacial gravels at Geneva, which contain Alpine pebbles, and the position of the moraines in regard to

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the drifts of the Italian plain, make it very doubtful whether these basins existed at all prior to the Glacial Epoch. They may even be post-glacial. When we look at a map we cannot fail to observe that the more important lakes occupy certain zones parallel with the general strike of the Alpine ranges. Moreover, away from the Alps, in a region untouched by glaciers, an important lake, nearly as long and as wide as Geneva, exists. This is the Dead Sea, the bed of which is nearly 2,600 feet below the level of the Mediterranean. Obviously it occupies part of an old river valley, of which probably the whole has sunk, but one part has been depressed unequally. Apply the same explanation to a mountain range in which the valley systems are already well defined. Its uprising has been caused by lateral thrusts: suppose these thrusts repeated from the old quarter, but with diminished intensity: movements—probably as before to an unequal amount—will take place along the old lines. The slope of a valley bed will thus be modified. The line of descent, as shown in a vertical section, will assume a somewhat serpentine form. The lower part will often be slightly pushed up, the succeeding segment correspondingly depressed, and a lake will collect in the hollow thus formed in the bed of a pre-existent valley. After many years' study of the contours of Alpine lakes I am convinced that no other explanation is possible. They are regions of subsidence like many fjords; only in their case—probably because it is a region of mountain making, one of lateral thrust rather than simple vertical rise or fall—an axis of slight upheaval has run parallel with that of depression, but somewhat lower down the valley.

Before proceeding further I must call attention to two facts which are closely connected with the present condition of the Alps—(1) that the rainfall on the Alpine slopes on the Italian side of the watershed, as a rule, is heavier than that on the other side, and (2) that the valleys also are steeper. It is indeed true that the distance from the watershed of the Central Pennines to the lakes on either side, north or south, is not very different, but the level of those on the latter is some 700 feet below that of those on the northern. This difference of level is especially marked on the upper part of the valleys, places correspondingly situated being always lower on the southern than on the northern face; for instance, Zermatt is rather above Macugnaga, but as the crow flies it is more than double the distance from the watershed.

For both the above reasons denudation will proceed more rapidly on the slopes of the Alps facing southwards or eastwards, that is, towards Italy, and thus the valleys in them will be cut back more quickly and be more precipitous at their heads than in the northern or western slopes. From this results a singular configuration of the uppermost parts of a valley, which is commonly exhibited by the passes selected for the construction of high roads. The usual form of a pass in the higher Alps, as every climber knows, is this: you follow a valley which at last leads you by a final ascent, more or less steep, to a gap or saddle between two peaks, on the other side of which a similarly formed valley is found to descend. Of such passes every variety exists, from the depression which must be reached by climbing a rocky wall, like

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the east side of the Strahleck or the south side of the Sella Pass, to those like the Col de la Valpelline where the final acclivity is comparatively slight. Occasionally, however, we meet with a type of pass of which the Maloya, at the head of the river Inn, may serve as an example. Noted as one of the lowest gaps across the watershed of the Alps, for its summit is barely 6,000 feet above sea level, its structure offers a problem which at first sight is sufficiently perplexing. The valley of the Inn ascends, on the whole gradually, to Samaden, where the river is joined by a torrent which carries the drainage from the northern face of the Bernina group. But though this brings the greater volume of water, it occupies a glen which is, orographically, of secondary importance, and the main valley continues onwards in a south-westerly direction towards the Maloya Pass. Samaden is about 5,600 feet above the sea; from it a rather steep but short ascent brings us to the level of the St. Moritzersee, the elevation of which is about 5,800 feet. We have now entered a rather broad and almost level valley, enclosed between mountains which rise on either side from 4,000 to 6,000 feet above it, the floor of which is occupied to a considerable extent by a group of shallow lakes. This trough is more than nine miles long; yet the Silsersee at its upper end is only 66 feet higher than the St. Moritzersee; hence the fall is only 15 in 10,000, or, roughly speaking, about seven feet in a mile. The Maloya Kulm is a very short distance from the head of the Silsersee, and is only a few feet higher than it; the height assigned to the lake being 5,872 feet, and to the pass 5,942 feet. I doubt, indeed, whether the latter measurement indicates the lowest point, and think that it would be possible to divert the waters of the Silsersee from the Black Sea to the Adriatic by a comparatively shallow cutting. But no sooner have we traversed this low ice-worn floor of rock than the scene changes in a moment; we are standing on the brow of a series of lofty cliffs; the road swings away to the left to seek a less precipitous part of the enclosing head of the valley, to the floor of which—nearly a thousand feet below—it descends by a series of zigzags. To what are we to attribute this singular configuration: this flat, almost level trough driven right through the crest of the Alps, and terminating so abruptly at the brink of a range of precipices? There is the river valley—one which seems to suggest, nay, to demand, the action of strong torrents for its making—and no torrent is to be found, for the mountains from which it could flow have vanished, and instead of a ridge we have vacant air!

Is this trough the work of glaciers? Certainly it bears everywhere the marks of moving ice. Members of the school of Ramsay might cite its wide but shallow lake basins as examples of the excavatory power of ice, and here, though I could point out some difficulties in the application of their theory, I should not be surprised if their claim were substantiated. But the glacier which exercised any erosive action on this trough can only have been formed by the fusion of ice-streams which descended from the mountains on either side. Hence it may have modified the superficial features, but in no sense can it be said to have excavated the trough, because, as already stated, there is not even

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a ridge at its head. Suppose the trough of the Maloya covered deep with snow and ice, it is obviously impossible that this can have exercised any erosive force of importance in the direction of the flow of the Inn, because here it would be almost at rest. Moreover, we can prove that when the glaciers of the Alps were vastly greater than now, and the Maloya was thus buried, the actual watershed of the pass—that is, the ice-worn rock on which the Kulm hotel now stands—was swept by a glacier which had its origin among the peaks on the southern side of the watershed—one represented at the present day by the Forno glacier; for on this rock are strewn erratics of the peculiar porphyritic granite which forms the crags on the western side of that glacier. We have only to stand on this ice-worn plateau among the erratics which mark the overflow of the southern ice-stream, to glance at one moment along the unbroken trough on the Swiss side, and the next down the steep crags into Italy on the other, in order to realise how slightly the glaciers of the Great Ice Age can have modified the pre-existent natural features of the district, and to justify us in assigning to them a very secondary place among the graving tools employed by Nature.

What explanation, then, must be given of this singular trough? I regard it as anterior in its dominant features to the extension of the ice. I suppose that when it was made no glacier intruded on to its floor; perhaps there were no glaciers among the peaks; at any rate, I do not suppose that the region of snow and ice was more extensive than at present. I believe, for I can find no other explanation, that in this part of the valley of the Inn we have a true valley of erosion, comparable, let us say, with the upper part of the Val Rosegg, one of those steps which not unfrequently precede the final ascent to the watershed. But I suppose that the watershed in this case once lay some distance further south, perhaps not very far away from the present frontier-line between the Engadine and Italy, say passing somewhere above the site of Vico Soprano. From this ridge the Inn then flowed towards the north-east, while on the other side the Maira descended towards the south-west. At the present time the Maira falls about 2,500 feet between Vico Soprano and Chiavenna, a distance of about 12 English miles, say full 200 feet a mile, and the Maloya Kulm is nearly 2,400 feet above Vico Soprano, a distance of about 5 miles as the crow flies, giving a total fall of almost 5,000 feet in some 18 miles of the river course, say 5 in 100 on the average; while the Inn, as has been said, descends at first almost imperceptibly, and between St. Moritz and the Finstermünz only falls 94 in 10,000, which is rather less than 1 in 100.

Obviously, then, apart from any consideration of rainfall, the erosive force of the Maira would be far greater than that of the Inn. Thus the streams of the former would bite more deeply into the dividing range than those of the latter. The intervening mountain mass was quarried away far more rapidly on the southern side, until at last the corrie at the head of the Maira ate its way back through the dividing ridge, and actually cut away the slopes by which the streams descending towards the Engadine were formerly fed. Thus I regard the floor of the Upper Innthal as the decapitated remnant of a very ancient

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valley, which, while important changes have been occurring on either side, has remained comparatively unchanged, because denudation must needs cease when its motive forces are gone. When the weapons are snatched from the hand of the destroyer, when his arm is paralysed, then he must cease from troubling and the weary may rest.

If we examine a good map of the district we find an interesting confirmation of the explanation just offered. The tributary glens of a river system bear a general resemblance, as everyone knows, to the branches of a tree—they tend to converge in the direction of the flow, as twigs unite to branches, and branches to the trunk. It is true that the changes from valleys of strike to valleys of dip give rise to sharp turns and 'kinks,' not unlike those in the boughs of an aged oak; but we rarely find a valley running almost in the opposite direction to that of the stream to which it is a tributary. Yet the long glens occupied by the Albigna and the Forno glaciers run due north, while the Maira for some distance is flowing almost exactly in the line of the former glen, but in the opposite direction. Moreover, the mouth of the upland glen leading to the Forno glacier is as nearly as possible on the level of the Maloya Kulm: its floor is reached from the latter by a track which keeps nearly at the same level, though the torrent which plunges downwards to the Maira has gashed the rock over which it rushes. Hence I believe that the streams from the Forno and the Albigna glens formerly flowed into the Innthal, as those from the Fédoz and Fex still do, but that, as the corrie at the head of the Maira gradually receded in a north-easterly direction, it intercepted and diverted, as its floor was on a lower level than theirs, first the torrent from the Albigna glen, and then that from the Forno. The diversion of these streams would, of course, augment the erosive force of the Maira and correspondingly diminish the amount of denudation in the upper part of the Innthal. Indeed, I think it probable that the torrent from the Forno glen has indirectly aided in producing the precipices which separate the Maloya Kulm from the floor of the Val Bregaglia.

Instances like the above are far from rare in the Alps. Most of the passes traversed by the great high roads, such as the Genèvre, the Cénis, the St. Gothard, the Lukmanier, to mention no others, furnish us with examples of a nearly level plain of considerable extent at their summits; they are, in short, troughs driven through the range, not sharp-edged saddles on the range To all these—very difficult to understand on the hypothesis that the watershed has always occupied its present position—the above explanation may be applied. I will only mention one other case, because it is in a region of sedimentary rock, seems no less anomalous than that which I have been describing, and brings us to a district where another difficulty demands an explanation.

On the Toblacher plateau—the water-parting between the Rienz and the Drave—the Ampezzo road turns off to cross the southern range in its course towards Venice. It passes through a deep trench in the dolomite mountains. On the one hand rise the grand spires of the Drei Zinnen and the turreted wall of the Cristallo; on the other the vast altar-stone of the Croda Rossa, with many subordinate summits.

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From Toblach to Landro, from Landro to near Peutelstein, the road is almost level. The rise from the entrance to the Höllensteinerthal to the shallow Durrensee, in which the crags of the Cristallo are mirrored, is less than 600 feet, though the distance is full six miles; and for the remaining six miles the total ascent is hardly more than 250 feet. The trough is then suddenly interrupted, almost as at the Maloya Kulm. From the northern, or rather the north-western, side of Monte Tofana, a glen comes sweeping round, the floor of which is some hundreds of feet below the level of the pass; to this a steep and narrow track was the only means of descent until the present road, with its series of zigzags, was constructed. When the floor of this glen is reached a more gradual descent leads to Cortina, which is a little less than 4,000 feet above the sea. Here, then, we have a repetition, though on a smaller scale, of the physical features of the Maloya; and here, also, I can find no other explanation of the apparent anomaly than that the watershed once lay rather further to the south, and that as the main feeder of the Piave deepened the valley between the Tofana and the Cristallo *massif*, it gradually cut away the rocky wall which once closed the glen to the west of Schluderbach.

But the head of the Pusterthal itself presents us with a somewhat similar anomaly, and this, singularly enough, finds a parallel at the head of the Etsch. The watershed in the former, though between the Adriatic and the Danube, is curiously ill defined. It is a flattish drift-covered plain, barely 4,000 feet above the sea, perhaps a third of a mile wide, guarded on the one side by the slopes and crags of the crystalline schists of the central range of the Tyrol, on the other by the magnificent dolomitic cliffs of the southern range. On the west—from Welsberg to Niederndorf (four miles) there is a rise of about 260 feet; from the latter place to Toblach (3 miles) a further rise of 150 feet; and from Toblach to Innichen, on the east side (2 miles), a descent of less than 100 feet. Thus the floor of the trough for some five miles does not rise and fall more than about 100 feet, and the average slope is less than 1 in 100. In the next eight miles the fall is only about 225 feet, which is still more gentle. But then it becomes more rapid; the valley contracts, its floor descends more sharply as the river passes through the Lienzer Klause, a defile cut into the crystalline schists about nine miles long. Lienz itself, 28 miles from Toblach, is above 1,750 feet below that place, while Untervintl, which is about the same distance on the western side, is some 300 feet higher than it. Here, then, I conclude that the original watershed must be placed to the east of the Toblacherfeld, and that the Drave has cut its way back into the upper part of the glen of the Rienz.

The pass of the Reschen Scheideck, which leads from the upper part of the valley of the Etsch to the Finstermünz in the valley of the Inn, exhibits a structure in some respects similar to that which has just been described. The Malser Heide, on which the pass lies, is a long and comparatively level trough, the watershed of which is less than 5,000 feet above the sea (4,898 feet). Thence the road declines gradually to Nauders (4,468 feet), and then drops rapidly down to the

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gorge of the Inn, the level of that river being about 3,700 feet above the sea.

To explain the structure of the region, I must go back to the time when the Inn had excavated a valley which was both shallower and narrower than that which it now occupies. Suppose that its bed was then about 5,000 feet above the sea, on the level of the Reschen Scheideck; at that time the head waters of the Etsch may have descended upon a ridge, the watershed of which lay near to the channel of the Inn. Gradually, as the latter river deepened and enlarged its valley, the ridge would be eaten away, until at last the head of the Reschen Scheideck trough was exposed. Then the brow of the declivity towards the Inn (as the rocks here are not very durable) would be rounded off, so that the edge of the old trough would not remain sharp, as in the case of the Maloya, but would be gently bevelled in the upper part, and thus the actual watershed would travel slowly and almost imperceptibly eastwards.

Instances where apparent anomalies may be explained by the principle of the unequal rate of recession of the heads of valleys on opposite sides of a line of water-parting might readily be multiplied, but I will notice only one other, and that briefly. Many of you will remember the structure of the Pennine Alps at the head of the Gorner glacier. Between the pyramidal summit of the Matterhorn and the *massif* of the Breithorn there is the marked depression crossed by the Theódule Pass—a breach in the rocky wall which is some two or three thousand feet deep; for the summits on either side are respectively 14,705 feet and 13,685 feet above the sea, while the crest of the chain at the Théodule Pass is barely 11,000 feet. From the Breithorn the rocky rampart continues practically unbroken, in a general easterly direction, as far as Monte Rosa, its peaks being well over 13,000 feet in height, and even the gaps between them only about 1,000 feet less elevated. In fact, from the Breithorn to Monte Rosa the crest of the range is never less than 12,700 feet above the sea. It culminates in the vast ridge of Monte Rosa, the highest peak of which is 15,217 feet above the sea, after which the watershed between Switzerland and Italy runs north, and we find another gap similar to that above mentioned, except that here a comparatively level snowfield is terminated by abrupt precipices on the eastern side. Everyone who has crossed by one of the Weissthor passes or who has ascended the well-known snowy hump of the Cima de Jazzi, will remember the startling contrast between the long and gentle ascent over slopes of snow on the western flank, and the precipitous descent on the Italian side. Between Monte Rosa and the Strahlhorn (13,750 feet) there is a gap of about three miles wide, the flattened crest of which undulates a little on either side of 12,000 feet. Besides this, a line of peaks, only a little subordinate to that of which Monte Rosa forms a part, terminates abruptly with the Strahlhorn almost on the watershed, instead of being prolonged, as might have been anticipated, by a spur on the southern side. Of this apparent anomaly we have not far to go in order to find an explanation. The head of the Val Macugnaga, which is a huge corrie, has cut back into the *massif* of Monte Rosa, and is partly enclosed by its eastern spur, which runs towards the

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Pizzo Bianco. The drainage from this corrie, starting in a northerly direction, sweeps round towards the east, passing under the great wall of cliffs which, as already mentioned, descends from the edge of the snow-field feeding the Gorner and the Findelen glaciers, and from that at the head of the Schwarzenberg glacier east of the Strahlhorn. Hence I conceive that the Strahlhorn was once part of a great spur thrown off from a range which extended in a direction rather east of north from Monte Rosa, and was elevated perhaps a couple of thousand feet above the present edge of the Gorner snow-field. The Cima di Jazzi might be a remnant of another spur from this range, and it is a noteworthy fact that the Monte delle Loccie, a peak over 12,000 feet on the eastern spur of Monte Rosa, is almost exactly on the line of the Strahlhorn axis.* This range has been cut away, as the great glen of Macugnaga was being deepened and enlarged, devouring the mountain group by which it is fed.

I pass on to another peculiarity, which admits of a similar explanation. Not unfrequently the higher peaks, especially in the district south of the Little St. Bernard, project slightly from the watershed on to the Italian side, like bastions from a wall. Such is the case with the Ciamarella, the Roche Melon, the Viso, and others. The Viso, indeed, is wholly an Italian mountain, for it is the culminating point of a long and deeply-gashed spur, extending towards the south-east from the main range of the Alps. The course, indeed, of the line of watershed is suggestive, for it forms about the head of the river Guil (flowing westward) a kind of cusp, near the point of which is the Viso. On the northern side of this cusp rise the tributaries of the upper waters of the Po; on the other, the feeders of a hardly less important Italian stream, the Vraita. To understand the orographical structure I look back to a stage in the process of mountain sculpture when the line of the watershed passed over the summit of the Viso, and its crest, elevated to perhaps a couple of thousand feet above the present level, ran in the same general directions as it now does, but some distance on the Italian side. The Guil continued to cut its way back towards the main peak, though slowly, as the slope of the upper part of the valley is not rapid. The glens of the Vraita on the one side of the peak and of the Po on the other side worked their way back more rapidly, and devoured the actual crest of the range. The descent on the Italian side is much more rapid than on the French; from the gaps, by which the range can be crossed from the latter country, to Crissolo in the Val di Po is a drop of nearly 5,000 feet. The descent from the Col de Vallante to Château Dauphin in the Val Vraita is about as much, while on the French side it would require some miles more walking to reach this level. Thus the Viso has been left projecting as a bastion. But nearly simultaneously with the above recession, two ravines, one tributary to the Po, the other to the Vraita, were cutting back into the curtain wall which connected the bastion peak of the Viso wall with the retreating crest of the watershed, until

* Possibly the curious shelf or trough of the Saas Weissthor is really the half of an old pass between the Strahlhorn and a missing peak.

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at last the heads of these glens met, and formed a kind of high-level ditch which isolates the peak from the actual watershed.

A similar principle may be applied to explain a very common feature in the higher regions of the Alps—namely, that the culminating peaks of important spurs are often hardly less elevated than those on the watershed. As an example, let us return to the Pennine range in the neighbourhood of Zermatt. The two branches of the Visp are divided and are bounded respectively by lofty ridges. A line drawn along the crest of the westernmost ridge would pass across the gap occupied by the Zmutt glacier to the peak of the Matterhorn; that drawn along the central ridge, as already said, would pass above the vast cirque at the head of the Val Anzasca to the Monte delle Loccie, east of Monte Rosa, while that along the easternmost ridge ceases rather abruptly near the head of the Val Antrona. On the first spur, full ten miles to the north of the Matterhorn as the crow flies, we find the Weisshorn, actually the higher by about 100 feet; the other peaks to the south being well above 13,000 feet, and the lowest gaps between them not much under 12,000 feet. Opposite to the Weisshorn rises the mass of the Mischabelhörner, the highest peak of which almost reaches 15,000 feet, and there is no point in the range south of it, till we have passed the Strahlhorn, which falls much below 12,000 feet, while its peaks are all over 13,000 feet above the sea. Lastly, in the rather less elevated range east of the Saaser Visp, we find peaks somewhat over 13,000 feet in height separated by passes which are not much below 12,000 feet. As may be inferred from what I have already stated, the principal gaps in the rocky rampart enclosing the head of the Gorner Visp correspond with the direction of its main axis, and of the tributary glens now occupied by the glaciers, Zmutt, Gorner, and Findelen. These gaps I attribute to the destruction of the original party walls by the recession of the heads of the Italian valleys. In order to comprehend the process by which the above-described structure has been produced we must dissolve away snow and glacier, and must replace the myriad millions of cubic yards of rock which have been removed by the action of water in all its forms. We will, however, for simplicity, suppose any covering of Secondary rock already stripped off. We may then picture to ourselves a broad arch of crystalline rock, slowly rising, perhaps not without pauses, until its flattened crown is full three miles above the sea. Its chord extends from the present valley of the Rhone on the one side perhaps to the Italian plain on the other. Into this mass the streams which start from its higher surface cut deeply, working their way backwards, and excavating the valley, so that every peak is a 'locus of least denudation,' standing like one of those prisms of earth which excavators leave to indicate the amount which they have removed.

It may be asked why, if the above explanation be correct, we do not find spurs on the southern side of the Pennines comparable with those on the northern. I reply because they have suffered more from and have been partly destroyed by the more rapid recession of the valleys on this side. As their tributary glens enlarge, as the great corries at their heads are extended, laterally as well as backwards, so the inter-

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vening masses suffer from corrosion, and at last even the peaks, which have for long been spared, must obey the general law, 'Dust thou art and unto dust thou shalt return.'

But on this subject passing time forbids me to dwell longer. I will only say that I believe the principles which I have indicated to be of general application in all mountain regions. There are, however, two topics indirectly connected with questions of Alpine sculpture which call for a brief notice. These are (*a*) what effects have snow and ice as erosive agents compared with running water, and (*b*) to what extent have the Alps, in the past time, been occupied by snowfields and glaciers? I have already said that I believe that, compared with torrents, glaciers are erosive agents of secondary importance. I may add that snowbeds appear to have, comparatively speaking, a protecting influence. Still, snowfields and glaciers in the upper part of a range act as storehouses for the water, and so keep the torrents always full; the former also give rise to endless streams, which have a plunging action, and form precipitous cliffs, as may be seen in cirques; the latter increase the erosive power of torrents by rendering their water muddy. I believe, therefore, that wherever there is unprotected ground, the process of excavation is aided and accelerated by the existence of snowfields and glaciers in the upper parts of the ranges. Hence I should infer that the sculpture of the most elevated regions progressed most rapidly when that of snow and ice was least extended.

The area thus occupied has doubtless varied greatly at different times in the past history of the Alps. I have already intimated that there is reason to think that at one epoch, late in the Miocene period, at least one glacier on the Italian side must have reached the sea-level. We know also that after the Alps had nearly assumed their present outlines, their glaciers were so enormously augmented as to cover the lowland of Switzerland, to well up against the side of the Jura, 1,500 feet above the Lake of Neufchatel, and to protrude from the mountains on to the Italian plain, where huge moraines, veritable ranges of hills, remain as monuments of their 'thick-ribbed ice.' We may explain these enormous glaciers by assuming variations in the height of the chain, in the amount of rainfall, or in the climate of Europe. The last is undoubtedly a true cause; but without entering into this difficult question, I should like to call attention to one thing which perhaps has not generally been realised—namely, that comparatively small variations in climatal conditions will greatly affect the size of glaciers. At the present day the glaciers are distinctly smaller than they were about thirty years since. In some cases their thickness has been diminished by twenty or thirty yards vertical; they halt quite 500 feet higher above the sea-level. About the year 1818 some *—perhaps all—the glaciers were quite as much larger than their size in 1858 as they are now smaller. Yet the change in the climate of the region during the last 70 years has been practically inappreciable. Let us assume that the level of the Alps has been but little altered during the period of which I am about to speak. From calculations

* Forbes, *Travels in the Alps*, p. 204.

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which I have made, to corroborate the observations of the snow-line in the Alps, it results that, over the lowland between the Lakes of Geneva and Zürich a mean temperature of 32° F. would now be reached at an elevation of from 7,000 to 8,000 feet above the sea, and over the plain of Piedmont at an elevation of from 8,000 to 9,000 feet. Now, suppose that, while all other conditions remained unchanged, the mean temperature of this part of Europe were raised only six degrees. The height of the snow-line in the Alps would then be at from about 10,000 feet above the sea in the Oberland, to 11,000 feet at the Viso.* But, even in the Pennines, where we might place it at 10,500 feet, it is seldom that any part of the great supply basins of the existing glacier reaches 12,000 feet. Under these conditions the glaciers would disappear from the greater part of the Alps, and those which might still linger in the recesses of the Pennines would dwindle down to the size of those which at the present time are dotted about that range east of Monte Leone. Next suppose the mean temperature lowered six degrees; the heights of the snow-line would be rather below 6,000 feet in the Oberland and 7,000 feet at the Viso. But in estimating the effect of this change we must remember that by it the collecting ground of the glaciers would be enormously augmented; we may say that for a rough standard of comparison the area of supply would vary as the squares of the difference of the mean temperature of its highest point from 32°.† I believe that this change alone would suffice to bring the ice stream at least down to St. Maurice on the one side, and to the neighbourhood of the Italian lakes on the other; while the greatest extension of the ice of which there is any record would probably not require a lowering of temperature of more than about 15° below that which at present exists. This assumes no change in the rainfall. If it were augmented at a time when the temperature was low, the glaciers would be correspondingly increased, because they immediately depend upon the amount of water that is collected in the form of snow upon their supply basins. If, however, it were augmented at a time when the temperature was comparatively high, as it probably would be, the work of sculpture in the higher ranges would be much accelerated. But on these topics, wide and tempting as is the field which they offer for legitimate speculation, I must not linger. The 'slow and restless march' of the clock, like that of the glacier, warns me to conclude by a brief summary of the results which, in these three lectures, I have endeavoured to lay before you. They are—

1. That the typical gneisses and crystalline schists of which the present Alpine masses are largely composed, though often modified by the earth movements which have caused the uprearing of the existing chain, are in no proper sense of the word due to these movements, and in all probability were gneisses and schists even when the Cambrian rocks of Britain were being deposited.

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* Taking 1° F. for each 350 feet, perhaps a little too slow a change.

† That is, if the mean temperature of the summit of an elevated region (without peaks of abnormal steepness) falls from 30° to 29°, the areas which can support snowfields are as 4 to 9.

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2. That, when the Carboniferous rocks of our own land were being accumulated, there were hills, perhaps even mountains, on the site of the present Alps, but that in all probability the trend of these ranges did not correspond with those which now exist.

3. That, shortly afterwards, the rocks were subjected to further disturbances, which probably produced folds, running roughly from north to south, and that there were great volcanic eruptions, especially in the eastern districts.

4. That about the same time a subsidence commenced, owing to which the sea gradually encroached upon the Alpine region, beginning from the east, so that here the Trias attains a very considerable thickness, while it is generally either poorly developed in, or wholly absent from, the central and western districts.

5. That before any considerable part of the Jurassic period had elapsed the ancient land region had either been wholly submerged, or had been reduced to a few insignificant rocky islands.

6. That, as a rule, until near the end of the Eocene period, this subsidence continued.

7. That a change—perhaps a comparatively rapid change—then set in, and the Alps slowly emerged in great wrinkled folds. These curved round the plains of Northern Italy, which at that time formed a sea gulf. The present line of the watershed roughly indicates the crest of the Miocene Alps, which was probably in elevation not inferior to that which still remains.

8. As the mountains rose, the work of sculpture progressed, the rivers transported the *débris* to the lowlands which fringed the chain, and spread it out or piled it up at the base of the hills.

9. But the process of mountain-making was not yet ended. In Pliocene times another series of thrusts acting outwards, from the basin of the Italian plains, still occupied by the sea, told with greatest effect upon the northern zone, especially in the quadrant between the latitude of Turin and the longitude of Ulm, thrusting up parts of the northern chain, elevating the newly deposited Miocene beds on the Alpine border, and puckering up the Jura.

10. That the process of sculpture was continued until at last, prior to the great extension of the glaciers, the Alps had arrived at very nearly their present condition.

11. That either just prior to, or during, or, as I think, more probably at the end of this period of ice-extension, there were some slight disturbances in the same general direction as before, so that, by a folding parallel with the axes of the ranges, the beds of the valleys were relatively somewhat depressed, while the ground at their embouchures remained approximately at the same level, so that the floor of the valley above was bent into a gentle curve, the sagitta of which sometimes amounted to rather more than a thousand feet.*

12. That in these folds the lakes accumulated, which at one time, as

* It must be remembered that no greater change in level is assumed than is generally admitted by geologists for the western side of Great Britain, where it has amounted to at least 1,200 feet.

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I would have shown had time permitted, stood at a somewhat higher level than at present, but which have been subsequently lowered as the effluent rivers deepened their channels.

13. That since the melting away of the glaciers, though of course denudation has continued in some places and deposition in others, the general structure of the Alps has not been materially altered.

So ends the story of the Alps, as I have been able to read it. There are other points in its latest chapter on which I would gladly have dwelt, but my time is exhausted; and this, I fear, may be true of your patience.

IN MEMORIAM.

ARTHUR THOMAS MALKIN.

Among the sad losses which have thrown such a dark shadow over the latter months of 1888, one remarkable figure has passed away which well deserves some notice in the annals of the Club.

Arthur Thomas Malkin, who died in London on November 18, at the age of eighty-five, had been a member of the Alpine Club from the second year of its existence. It is some time now since his tall, athletic form, his open and hearty countenance lighted up by his bright and kindly eyes beaming from under his shaggy eyebrows, had been seen in the Club rooms; but although prevented by advancing age from attending their meetings, his thoughts were always with his old comrades, and to his last days he delighted to gather under his hospitable roof, in Wimpole Street, old companions and young, with whom he could converse of former times and of his beloved Alps. Malkin was a genuine mountaineer, an ardent lover and admirer of nature, whose beauties he was fully able to appreciate with his highly artistic and cultivated mind. He was also a first-rate climber, at a time when climbing was a thing very different from the easy-going and luxurious ways and trodden paths of the present day. Before the majority of the present members of the Alpine Club were born, he had ascended the Mont Vélan and crossed the Strahleck, the Cols d'Hérens, de Collon, du Géant, and the Weissthor. He had also spent summers in exploring the mountain districts of Switzerland, Savoy, and Northern Italy. The journals left by him, written in an easy and graceful style, often sparkling with wit and humour, which, thanks to the kindness of Mrs. Malkin, the present writer has had the privilege of perusing, testify to the depth of the keen enjoyment and intense admiration with which his climbs and wanderings in the high Alps filled his mind.

In 1839 he spent the greater part of the summer in the Oberland and Simplon districts, making also an excursion round Mont Blanc. In August 1840 he first visited Zermatt, sleeping at the little inn kept by Dr. Lauber (opened in 1839), which became afterwards the well-known Monte Rosa Hôtel; he crossed the Théodule, the Cîmes Blanches, the Col d'Ollen, and the Monte Moro, returning to Geneva, where, full of enthusiasm for his newly found paradise, he persuaded his wife,

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and his friends Mr. and Mrs. Edward Romilly and Mr. Marcet, to return with him to Zermatt. There the whole party went to the Schwarzsee and Hörnli, and to the Théodule, returning to the Rhône valley and making probably the first traveller's ascent of the Eggischhorn. This excursion, which is described in the sketch-book left by one of the ladies to serve as a visitors' book at Zermatt, deserves to be recorded as what was a very early visit made by travellers to that now favourite and beautiful Alpine station. Summer after summer found him exploring the Savoy, Swiss, or Italian Alps, and in 1878, at the age of seventy-five, he was still climbing, with all his old physical vigour and boyish enthusiasm; it was, as he said not long ago, 'the one early delight which old age did not remove the zest for.'

Readers of Murray's Handbook to Switzerland (second edition, 1842, and third edition, 1846) will be able to form an idea of what Malkin's work in the Alps has been; for the well-known initials A. T. M. are to be found in that volume attached to many most graphic and remarkably accurate accounts of excursions or ascents of passes and mountains, some of them seen or described then perhaps for the first time by an Englishman. He also contributed out of his abundant stores of mountain knowledge to Mr. Ball's 'Alpine Guide.' Few men have helped more than he has to make known in this country the land which has now become to the Alpine Club as a second home; few more fully deserve to have their name enrolled amongst those of the pioneers of the Alps.

Malkin resided during a great part of the year on his beautiful estate of Corrybrough, overlooking the valley of the Findhorn, not far from Inverness; there he was beloved, not only as a friend and neighbour and a keen sportsman, but as a kind and liberal landlord, ever thinking of the welfare of his people.

The last remnant of a generation which has now disappeared from among us, Arthur Malkin will ever live in the memory of those who knew him, as the type of a high-minded, warm-hearted, and accomplished gentleman, and a model mountaineer. H. Pasteur.

COUNT PAOLO BALLADA DI ST. ROBERT.

The 'Rivista Mensile' of the Italian Alpine Club for November last conveys to us the intelligence of the death, at Turin, on the 21st of that month, of Count Paolo di St. Robert, one of the most valued of our Honorary members, and one of the most distinguished of Italian scientific men. The following notes of his life and work are derived, partly from the obituary notice in the 'Rivista,' partly from information kindly communicated to me by Mr. Ball, with whom he lived on terms of intimate friendship for many years, and partly from my own intercourse with him, which I had the privilege of enjoying, chiefly by correspondence, from the year 1862 to within a few years of his death. He was born in 1815 at Verzuolo, near Saluzzo, in Piedmont, within a short distance and almost in sight of the celebrated mountain he was afterwards destined to know so well. Being intended for the

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profession of a soldier, he entered the 'Accademia Militare' of Turin in 1825. Following the natural bent of his genius for mathematics, he passed into the Sardinian Army in 1835, as lieutenant in the artillery, and rose rapidly to the rank of colonel. He taught the science of projectiles ('la scienza balistica') in the practical school of artillery and engineering, and received, for distinguished merit, the cross of the Military Order of Savoy. In 1857 he resigned his commission, and thenceforth devoted himself entirely to scientific pursuits.

It was in August 1862 that the writer, in company with Dr. Bonney, first met St. Robert at Crissolo, in the valley of the Po. It was this meeting which led to the first Italian ascent of Monte Viso, made on August 12, 1863, by St. Robert, his brother Giacinto, Quintino Sella, and Giovanni Barocco, as related in a letter from Sella to Professor Gastaldi, first published in the 'Opinione' of Turin; * an ascent which led in its turn to the foundation, on October 23 in the same year, of the Italian Alpine Club.

His Alpine work was scientific rather than sensational, and we must remember, in judging it, that it was commenced at the age of forty-eight. In 1864 and 1865 he explored some of the less known parts of the Maritime Alps, making, in the former year, the first ascent of the Cima dei Gelas (10,286 feet), and in the latter the first ascent of Mont Tinibras (9,948 feet). In the first of these excursions he rediscovered the Saxifraga florulenta of Moretti, a plant supposed to have become extinct, which grows on the slopes of the Gelas and nowhere else in the world. In 1867 he spent some time in the valleys of Lanzo. On August 17 in that year he made the ascent of the Ciamarella (12,061 feet), the peak at the head of the valley of Ala. This was the second ascent, the first having been on July 31, 1857, by Signor Antonio Tonini, an Italian engineer. St. Robert found that the peak is wholly Italian, separated by about 800 mètres from the frontier ridge between the Maurienne and Piedmont. He started from the head of the Balme or Ala valley, and reached a point on the ridge W. of the peak, since known as the Col or Roccie St. Robert (3,443 mètres), but, finding the ridge in a difficult condition, retraced his steps to the glacier S. of the peak, and reached the summit by the southern face.† Later he was again in the Maritime Alps, and ascended the Pelvo d'Elva (10,053 feet).‡ In 1871 he turned his attention to the Abruzzi, ascending their highest peak (which is also the highest point in continental Italy south of the Alps), the Gran Sasso d' Italia (9,584 feet).§ His memoir on this mountain is a model of excellence in scientific geography. In 1872 he revisited the valleys of Lanzo, and, with three friends, Signori Lessona, Gras, and Struver, made, on August 12, the second ascent of the Torre d' Ovarda (10,089 feet), the first having been made by a hunter some

* It has been lately reprinted in the *Cronaca del C. A. I.* (p. 1), noticed in the last number (p. 174) of the *Alpine Journal*.

† *Bollettino del C. A. I.* Nos. 10–11, pp. 243–263; *Gita al Monte Ciamarella nelle Alpi Graie*, 1867.

‡ *Boll. del C. A. I.* No. 18, p. 381.

§ *Gita al Gran Sasso d' Italia*, 1871.

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years before. This peak is the highest point in the range which separates the valleys of Ala and Viu, and is due north of Usseglio in the latter valley.*

It is rather for his scientific work than his mountain exploration that St. Robert's name will chiefly be remembered. He had a complete command of mathematics, as an instrument for the investigation of physical problems. The versatility of his genius was no less remarkable than his industry in writing. He was a good botanist and entomologist, and so excellent a linguist that when he sent to Mr. Ball for correction the papers on hypsometry, which he contributed to the 'Philosophical Magazine,' they were written in such correct English that only a few trifling errors were found in them.

His contributions to science were very numerous. They include a valuable Treatise on Thermodynamics, which reached a second edition in 1870. His occasional papers alone, published previously to 1874, have been collected into three goodly volumes. I am not aware whether since that date further volumes have appeared. It is impossible in the present notice to give a complete list of his scientific writings. Those connected with atmospheric physics are the most interesting to mountaineers. Among them the following are deserving of special mention :—'Barometrical Formula resulting from Mr. Glaisher's Balloon Ascents' ('Philosophical Magazine,' February 1864); 'On the Measurement of Heights by the Barometer' (*ibid.* June 1864). In this paper St. Robert developed a new and very useful formula founded on the hypothesis that the density of the air decreases in arithmetical progression in ascending from the earth's surface. The subject is pursued in a series of papers published at various dates between the years 1864 and 1867, and was explained by the writer of this notice in the 'Alpine Journal' (vol. iv. pp. 94–106). St. Robert prepared a series of elaborate hypsometrical tables founded on this formula, and constructed a sliding rule by which the height of a station could be read off at sight. Two papers on 'A New Method of Measuring Heights' were published by him in the 'Alpine Journal' (vol. vi. pp. 414–420; vol. vii. pp. 204–211). In these the author explains a method of determining the height of an inaccessible point by using a vertical base line instead of a horizontal one, the height of the former being found by means of the barometer. An interesting paper of his on the vexed question of 'The Retreat of Glaciers,' communicated in 1884 to the 'Reale Accademia dei Lincei,' was reviewed in the 'Alpine Journal' (vol. xii. pp. 134–6).

In his later years St. Robert lived in comparative retirement, and spent much of his time in a country house near Asti, close to which he built a tower which commanded a panoramic view of the entire range from Monte Rosa to the Maritime Alps. He closed a well-spent and laborious life at the age of seventy-three years, and bequeathed his valuable library to the Municipality of Turin as an addition to the Public Library of that city. WM. MATHEWS.

* *Una Salita alla Torre d'Ovarda*, 1873.

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ALPINE NOTES.

MEMORIAL TO THE LATE MR. W. F. DONKIN.—A brass will be placed in Eton College Chapel, by permission of the Provost, Dr. Hornby, to the memory of Mr. W. F. Donkin. Any personal friends of Mr. Donkin who wish to join in erecting the memorial may communicate with Mr. D. Freshfield, 1 Airlie Gardens, W.

A NIGHT ON THE ELBRUZ SADDLE.—We take the following from the February number of the 'Proceedings of the Royal Geographical Society:'—Baron Ungern Sternberg, a German physicist at present in the Caucasus, forwards the following account of an adventure which well-nigh proved fatal to himself and his companions.

The recent experiences of M. J. Vallot on Mont Blanc,* when a party of four spent three days and nights in a tent on the actual summit, have suggested a physical explanation of the fact often observed by mountaineers, that mountain sickness, at any rate up to 20,000 feet, can, in the majority of instances, be overcome by training. The following passage (pp. 33–34) gives the result of M. Vallot's experience:—

Par quel mécanisme d'accommodation les habitants des hautes régions du globe peuvent-ils s'habituer à l'air raréfié des grandes altitudes? Là encore mes expériences peuvent donner la clé du mystère. Trois journées d'habitation au sommet du Mont-Blanc ont suffi pour modifier entièrement le régime de ma respiration; le dernier jour, ma capacité pulmonaire avait notablement augmenté et mesurait 250 centilitres; le nombre des inspirations était de 17 par minute, au lieu de 14 dans la plaine. Quant à la profondeur des inspirations, elle avait doublé, étant devenue de 100 centilitres. Ainsi, l'air était deux fois moins dense que dans la plaine, mais il en entrait deux fois plus dans ma poitrine, ce qui rétablissait l'équilibre; aussi je ne ressentais plus aucun des symptômes du mal de montagne.

Dr. Marcet had previously written,† 'As a person ascends beyond a certain height above the sea-level he breathes less air, reduced in volume to the freezing-point and seaside pressure, to burn a certain weight of carbon or produce a certain weight of carbonic acid, than he does at or near the sea-level.'

Physicians must be left to decide between these explanations. Meantime it is a remarkable fact that no sensation of discomfort from the rarity of the air should have been recorded among a party of seven during a prolonged stay at a height about 1,000 feet above Mont Blanc, and only 500 feet below the highest recorded bivouac of the Schlagintweits on Ibi Gamin.‡ A similar absence of any such affection was noted in the first ascent of Elbruz, whilst in the second (Mr. Grove's) most of the climbers suffered severely. In 1868 and 1888 there was a high wind, in Mr. Grove's ascent none; and, so far as my observation goes, still fine weather appears to predispose to mountain sickness. I throw out this observation, however, only for confirmation or contradiction by the experience of others.

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* *Annuaire du Club Alpin Français*, 1888, vol. xiv. pp. 13–40.
† *Alpine Journal*, vol. xiii. p. 9.
‡ *Alpine Journal*, vol. xii. p. 31.

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The following is an abbreviated translation of the Baron's graphic account:—

On August 23 last I started from the camp of the Survey officer, M. Golombievsky, with him and nine Cossacks. My object was to take magnetical observations on the saddle between the two summits of Elbruz, and to examine a crater marked by M. Golombievsky on his map, of which he claimed to be the discoverer. We ascended over the Iriktchai Glacier. At 6 P.M. we reached the snow and breccia or lava crags which rise out of the névé. The night was clear, with a cold wind. The Cossacks were badly supplied with provisions, and M Golombievsky and I shared ours with them. (Bar., 38·39°; temp., 1·¾° R.) We started late on August 24. We crossed the névé plain; the slope began to steepen. Ice necessitated step-cutting, and the Cossacks, who had no nails in their boots, roped themselves. M. Golombievsky and I had Steigeisen. We came to a very steep ice-slope (28°), which, after some 300 steps had been cut, led up to a snow plateau. We spent a stormy night on rocks, at a height of 14,700 feet. (Bar., 35·01°; temp., 3·75° R.) On August 25 we started about 11 A.M. Four of the Cossacks knocked up and all wished to return, but finally five agreed to accompany us. About 5 P.M. it became less stormy, and fine snow began to fall. To return by the difficult route we had come was impossible; we were all too tired. I hoped to find shelter on the north side of the mountain, as we could not be far from the crest. The storm and snow-wreaths ceased for a moment—we saw our goal before us. We were soon above. A broad expanse opened out; we crossed this, and a "Hurrah!" in honour of the Czar echoed from the andesite crags. We quickly crossed the summit ridge and began to go down. About 100 yards below the saddle we found at 6.30 P.M. miserable night quarters, under the shelter of some isolated small crags, exposed to hail-storms, snow, and hurricane. The cold was frightful; we had no tent: I and M. Golombievsky huddled up together, and both felt that our camp might well be our grave. In the night the storm only increased. I have been in a hurricane on the island of Dago in the Baltic; I have been surprised by a snowstorm on the Aletsch Glacier in the Alps; but I had never even imagined a tempest of such violence. It was clear to me that we must wait where we were till the weather improved. Probably the storm extended low down, and should we start the danger of losing some of our party in the numerous crevasses would be greater than that of freezing where we were tolerably sheltered. I must be pardoned for hurrying over the descent; it is too painful a subject: it was a fight, and a disorderly, reckless one. In the end I remained in the rear with a sick, exhausted Cossack. It was not I who found the descent in the storm, it was God alone who led us two unhurt through the innumerable crevasses. On the evening of the 26th I found myself safe, but with frost-bitten feet and hands, at the Kosh (shepherd's hut) you know well in the Terskol glen. For the exact accuracy of the foregoing account I pledge you my word as a gentleman. We spent sixteen hours at a height of 17,840* feet, according to M. Golombievsky's measurements.

The attempt recorded above is the first occasion on which Elbruz has been approached by a route the practicability of which I pointed out in 1869, that is, by the eastern glacier, which flows from under the eastern peak into a glen, the stream of which joins the Baksan above Urusbieh. This route is shorter in distance, but doubtless longer in time, owing to

* According to the latest official map in my hands the height of the saddle is apparently given as 17,570 feet, but the figures may possibly refer to a point below it. The two summits of Elbruz on the same map are marked as 18,470 and 18,347 feet, but until the exact points measured and the method of measuring have been fully ascertained it will be prudent to adhere to the figures of the five-verst map.

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the extent of snow and ice to be traversed, than that by the Terskol glen, on the south-east, previously adopted.

The crater mentioned in this account evidently lies on the eastern flank of the eastern peak of Elbruz. It has apparently no connection whatever with either of the two craters, described respectively by Mr. Grove and myself, which form the actual summits of the mountain. It seems, however, that this fact has not been universally recognised, and some doubts, which I conceive to be uncalled for, have been consequently cast on the survey officer's claim to its discovery, on the ground that it had been previously noted by Mr. Grove or myself. So far as I know, M. Golombievsky was its discoverer.

From the above account it is obvious that the climbers committed a grave imprudence in pushing on in spite of more than doubtful weather on a mountain at once so lofty and so exposed as Elbruz. That they survived sixteen hours' exposure to storm at such an altitude, and that their desperate descent did not end in disaster, was better fortune than could have been anticipated. It is greatly to be desired that Russians should take a leading share in the thorough exploration of the glaciers and peaks of the Caucasus. But it is only a due return for much courtesy to warn emphatically Caucasian explorers of every nationality that, unless they approach the great mountains with a strict observance of the laws of mountaineering, frequent disasters must inevitably ensue. Elbruz, in particular, is at once a very easy and a very dangerous mountain. Only tyros in mountaineering will find any paradox in this statement, which I desire to recommend earnestly to the attention of all whom it may concern.

Baron Ungern Sternberg further enquires whether his expedition can be correctly described as an ascent of the summit (*Gipfel*) of Elbruz. The answer is clear. An ascent of a mountain is an ascent of its highest, or one of its highest, peaks. In the case, for instance, of the well-known Wetterhörner, in the Bernese Oberland, an ascent of the Mittelhorn, or of the Hasli Jungfrau, may be properly described as an ascent of the Wetterhorn. The case of Elbruz is an exact parallel. Again, a *Gipfel*, or summit, is a prominence, as distinguished from a *Sattel*, or depression, in a mountain crest (*Kamm*).* Baron Ungern Sternberg's expedition may be most correctly described, therefore, as a 'Besteigung des Elbruz Sattels,' or Ascent of the Elbruz Saddle. In geographical literature generally, however, and particularly in Germany, the word 'ascent' or its equivalents have been commonly used with unscientific and regretable laxity, with the natural result that errors and confusions have arisen, and have been necessarily followed by contradictions and explanations. It was on this account that I qualified my reference to the expedition in question in the preceding volume (p. 762) by the words 'according to the newspapers.' Geographers will be indebted to Baron Ungern Sternberg for affording a convenient opportunity for a public statement of the principle long ago recognised and adopted by the Alpine Club.

An apt illustration of what I have written above comes conveniently

* See Von Sonklar's *Lehrbuch der Geographie*, part ii. p.

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to hand at the last moment. In the number of the 'Globus,' a deservedly popular German geographical magazine, of January 7 last will be found an article entitled 'Besteigung des Kasbek,' and signed by Herr von Seidlitz, of the Statistical Department at Tiflis. It is, in fact, an account of the adventures of some Ossetians who made two plucky attempts to ascend Kasbek from one of the northern glens west of the Dariel Gorge, but were on both occasions driven back by bad weather at the foot of the final peak. Some years ago I ventured to extend or particularise a well-known epigram by asserting that 'Caucasian critics are climbers who have failed.'* Herr von Seidlitz is at pains to prove again how thoroughly I was justified. He adopts and enlarges on local reports in order to prove that I and my companions set up a false claim to have climbed the peak in 1868. He grossly misquotes me to the effect that our party only took the incredibly short time of four hours in climbing the mountain, whereas I stated that we took four hours in ascending from 11,000 to 14,800 feet, and 5½ hours in climbing the further 1,800 feet to the top. An answer to all his arguments is to be found in my 'Central Caucasus,' which he might have read in the museum at Tiflis.

Further reply to so unconscientious a critic would be thrown away. It may be serviceable, however, to any Russian or Caucasian climbers who desire to verify the advantage of the route discovered in our descent in 1868 if I repeat the following simple directions. Follow the Tshach, the chief tributary of the Devdoraki torrent, to its source, then climb the easy slopes on the (true) right of the Atchieretchi Glacier to the ridge separating it from the Devdoraki Glacier. Bivouac for the night under a rock tower above the icefall of the latter, visible from the spot whence the Devdoraki Glacier has been photographed. From this tower (marked 'Volgichki, 13,454 feet,' on some maps) it is easy to enter the great névé plateau at the northern base of the two peaks of Kasbek, which was apparently attained from a more westerly valley by Herr von Seidlitz's Ossetian friends. From this plateau the ascent of the peak offers no greater difficulty or danger than that of Mont Blanc from the Grands Mulets. And when a hut has been constructed at the sleeping place the only hardship will be avoided. A direct ascent from the station by the eastern or southern face will, however, always be a more or less difficult or dangerous expedition, according to the state of the snow on the very steep upper slopes. Doubtless before many years have passed the ascent from the north will be frequently made, and tourists of all nations will look back with mingled amusement and surprise to the lucubrations of the learned men who were unfortunate enough to find 'able editors' ready to exhibit to the world how little they understood, or were able to appreciate, the details of mountain climbing, the configuration of Kasbek, or the ordinary veracity of Englishmen. D. W. Freshfield.

Congresses of the Foreign Alpine Clubs.—According to a recent decision, the Swiss Alpine Club holds its festival every two years only. The next will take place in 1889, under the management of the Uto

* *Alpine Journal*, vol. xii. p. 338.

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section, in the town of Zürich. The delegates from the several sections, however, are bound to meet every year for the discharge of current business. They assembled on September 17 at Olten, to the number of fifty-four, besides the central committee. The most interesting subject was a report presented by the Central Committee relating to the project of requesting the Federal authorities to consider the advisability and possibility of executing a relief of the mountain regions of Switzerland. The report laid stress on the military and educational value of such a relief, roughly estimated the cost at 250,000 francs (10,000 francs per sheet of the Federal map), and the time it will require at twenty years. It recommended that the Club should not undertake any financial responsibilities in connection with it, though occasional small grants might be made. In the debate that followed it was urged that the S. A. C. was quite wealthy enough to make an annual grant of 1,500 to 2,000 francs to further such an excellent object, and the scale of 1/25000 was suggested, but Herr Simon inclined to make it 1/10000 (as the Swiss Scientific Society desired also), though allowing that in that case the Siegfried map would have to be supplemented by minute local investigations, and pointing out that the cost would far exceed 10,000 francs per sheet. Eventually the original report was accepted by 29 votes to 23. The central committee was requested to ascertain whether in the clause of the will of the late M. Bétemps, by which 3,000 francs were left to the S. A. C. for the construction of a club hut in the Monte Rosa district, it would not be possible to strike out the limitation as to the district. (M. Bétemps' executor has since agreed to waive this limitation, and there now seems no hindrance in the way of constructing the long-wanted club hut at the very head of the Val de Bagnes). The proposal of the Neuchâtel section that an attempt should be made to draw up a tariff of guides' fees, which should be uniform throughout the Confederation, met with very little favour, owing to the extreme difficulties in the way, and was rejected by a large majority. It was further resolved not to alter the existing badge worn by members of the Club. The accounts for 1887 showed a balance of 26,000 francs in favour of the Club.

The twentieth general assembly of the Italian Alpine Club took place at Bologna on September 15–16, more than 250 members taking part in it. The prize of 500 lire offered by the King to that one of the sections of the Club which had done the best work in making its district known by means of guide-books, or by promoting improvements in order to attract more visitors, was awarded to the Varallo section, which is the second oldest of the Club, having been at work since 1867. The announcement of the Queen's expedition to the Col du Géant was received most enthusiastically, and it was resolved to present an address to her Majesty, in honour of whose ascent the Turin section has decided to place a tablet on the wall of the hut on the Col. It was decided that the 1889 congress should take place at Ascoli Piceno, in the Monti Sibillini, not far from the north extremity of the Abruzzi range. The banquet was, as usual, very successful. Excursions were made on September 17 to Rimini, and that 'freak of freedom' the Republic

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of San Marino; and on September 18–19 to the summit of the Cimone (2,165 mètres) in the Pistojan Apennines.

The delegates of the various sections of the Italian Alpine Club met on June 29, 1888, in Turin. In the report on the general position of the Club we note that the warmest thanks were given to the Alpine Club, for its splendid contribution of 7,627 francs to the fund for the relief of the districts to which the avalanches of the past winter had done so much damage. The formation of four new sections (Leghorn, Cremona, Carrara, and Chieti) was announced. The number of sections on December 31, 1888, was 34, and of members 4,517. The total income of the Club for 1887 was 34,423 francs, and the outgoings 33,398 francs, thus showing a surplus of 14,227 francs, just 1,000 francs more than the surplus of 1886. Among the subjects mooted in the general discussion was the question of how best to reward the contributors to the 'Bollettino' (whether by a medal or by an honorarium), and the difficulties in the way of taking books out of the Club library. It appears that in the latter case it has been proposed that the demand for a book should be made by the section of which the applicant is a member, and that the section should be responsible for any damage done to the book; whereas at present the borrower has to deposit double the value of the work taken out, even though only one volume or part is wished for, and many works are 'confined' to the library. The Central Committee promised to take these grievances into consideration, and we shall be curious to see what remedy is suggested for them. Signor Grober moved a very hearty vote of thanks to the Alpine Club for its noble contribution to the avalanche fund; this was carried unanimously, and amid cheers. The Italian Club seems to be in a very prosperous condition, and the perusal of the report (to be found in the *Rivista Mensile* for July, pp. 237–247) is to be strongly recommended, as it proves that the Club and its sections do far more than merely build huts and improve paths.

The German and Austrian Club held its fifteenth congress from September 7 to 9, at Lindau, on the shores of the Lake of Constance: 548 members were present besides guests, but the bad weather spoilt nearly all the excursions which had been arranged. The indoor festivities were brilliant and successful. On the 8th there was a fête on the lake, followed by splendid illumination of the banks. On the 9th, 350 persons were present at the grand banquet.

The meeting for business was held on the morning of the 9th. It was announced that the Club consisted of 21,661 members, distributed among 164 sections, a great increase in both points since 1887. Fifteen new huts had been built, making a grand total of 112 huts erected by the Club. The seat of the central committee of the Club is to be at Vienna for the three years 1889, 1890, and 1891, Herr Carl R. von Adamek being the First President. The meeting in 1889 will be at Botzen, in the Tyrol. It was resolved to institute observations as to the rise or fall of the level of Alpine lakes and streams, and to appoint a committee to consider and report on various questions as to the maintenance of huts and paths, ownership of huts, revision of the Club hut rules, &c. Grants in aid of huts and paths were made

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to the amount of 33,500 marks. The 'Mittheilungen' are to appear henceforth on the 15th and 30th of each month, and not, as at present, on the 1st and 15th. The accounts for the year 1887 showed a surplus of 4,411 marks.

The French Alpine Club has lately elected M. Jules Janssen, the famous astronomer (Member of the Institute, and President of the Académie des Sciences), as its President, in the place of M. Xavier Blanc, who has now twice resigned the presidential chair. In June the Club numbered 5,497 members, distributed into 42 sections. The summer congress of 1888 was held from August 11 to 22 in and around the great manufacturing town of S. Etienne, not far from Lyons. The banquet took place on August 16 at S. Etienne, and a great number of excursions on all sides were organised, to the Mont Pilat (4,802 feet, the highest point of the Cévennes), Le Puy, the gorges of the Loire, of Semène, and of the Allier, &c.; but the attendance is reported to have been less numerous than usual at the summer meeting, owing no doubt to the great success of the congress held at Nice last April. The 1889 Congress will meet in Paris in the month of August.

ALPINE CLUB RELIEF FUND IN AID OF THE SUFFERERS BY THE RECENT AVALANCHES IN THE ALPS:—

	£	s.	d.
Amount received as per particulars 'Alpine Journal,' vol. xiii. p. 546, and vol. xiv. p. 66	534	12	3
Received subsequently .	2	0	0
	536	12	3

	£	s.	d.
Sent to Italy . . .	300	0	0
„ Randa. . .	40	0	0
„ Saas . . .	40	0	0
„ other parts of Switzerland .	145	13	1
Advertising, printing, &c.	10	19	2
	536	12	3

THE NEW ROUTE UP THE JUNGFRAU FROM THE ROTHTHAL.—As from the various notes that have appeared in the 'Alpine Journal' with reference to the ascent of the Jungfrau from the Roththal by the new route there seems to be some difference of opinion as to the character and difficulty of the route, I send a few notes of an ascent made on August 14 last.

Two parties (Messrs. Bayley and Hodgkins with old Christian and Johann Almer, and myself with Johann Kaufmann and Gottlieb Meyer) were the first occupants of the new Roththal hut on the night of August 13. This is quite a new hut, and is a detached building facing west, at the back of the huge boulder against which the old hut was built. The new hut is commodious, having two rooms, and is well supplied with cooking utensils and coverings, but when we were there had not yet been provided with straw in the bed-place. As none of the parties, guides or travellers, had been up the mountain by this route before, it was thought to be as well not to start till daylight, so we did not leave the hut till 4.15 A.M. on the 14th. Our route led us at first almost at a level along the base of the wall of precipitous rocks forming the northern boundary of the Roththal, back in the direction of the valley of Lauterbrunnen, until we

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reached the point where the wall falls precipitously to that valley. Here the wall was low, and we were able to wind upwards round its end to a sort of gently sloping plateau of rock above it. We then doubled back in a north-easterly direction over this plateau towards the foot of a steep ridge of rock, running up towards the Silbergrat. At 6.20 A.M. we reached an arête, separated by a small snow-saddle from the main mass of the mountain, and put on the rope. At 6.55 we halted for breakfast beyond the snow-saddle at the foot of the great buttress leading up to the Silbergrat. At 7.15 A.M. we started again and tackled the buttress, mounting mostly by the rocks, but sometimes by snow-beds which this year filled the gullies. We could see two ropes hanging to the rocks above us, and directed our course towards them. The climbing was interesting but not difficult, the rocks being sound, with plenty of hand- and foot-hold, until we reached the lower and longer of the two ropes fastened to the rocks. This rope led up a shallow flat trough or gully, steep and with not very much foot- and hand-hold. The rope certainly facilitated the ascent of this gully, but I think we could have got up without it. Above this the rocks were again fairly easy till we reached the second rope. Here a boss of rock swelled out and rather overhung, and on it there was no hold; so we caught hold of the rope one at a time, and, putting our feet against the rock, walked up with our feet and climbed hand-over-hand on the rope till we could get a hold above the boss. Above this easy rocks again led us to the top of the ridge. We then stood on the snow-covered ridge which runs in a south-westerly direction from the peak of the Jungfrau. Before us as we topped the ridge was a gigantic hollow, beyond which and below us was the Silberhorn. In this hollow lies the Hochfirn, and its head is enclosed between two ridges, one to the south, on which we stood, and the other that joining the Silberhorn with the Jungfrau. These ridges, both abut at the foot of the final peak, and at that point our route I fancy joins that from the Wengern Alp. Behind us lay the Roththal; on our left the ridge dropped steeply to the Lauterbrunnen valley, and on our right led up to the Jungfrau. We turned along the ridge, and, the snow being in very good order, had no difficulty in following it to the final peak, and, clambering up a rocky rib, we joined the track from the Roththal Sattel only two or three hundred paces from the highest point, which we reached at 11.15 A.M., having gone very easily. Here I parted company with Bayley and Hodgkins, they going to the Bergli, while I went down to the Concordia hut, and next day to the Bel Alp. This ascent appeared to me by no means difficult. The two places where the ropes are fixed are the only ones that are not quite simple, and even those ought not to be very troublesome to a competent party, unless the rocks were covered with ice. We fortunately found very little ice on the rocks. The route also seems to be quite safe. The rocks are firm, and I saw no sign of avalanches.

On August 17 I left the Bel Alp at 3.5 A.M., with the same guides, to return to Lauterbrunnen and Grindelwald, by the Beichgrat and Wetterlücke, intending to sleep a night in the Lötschthal. We reached the Beichgrat at 8 A.M. and the Gletscherstaffel huts, in the Lötschthal, at 10.45 A.M., after some glorious glissades down the steep snow-slopes

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below the pass. The weather had begun to look threatening for some little time, and on the way down from the pass I had asked Kaufmann what he thought of it and what we could do, as I did not relish the idea of being weather-bound in the Lötschthal. He suggested that, if I liked, we might go on and try and get over the Wetterlücke also. I jumped at the idea, but as we got to the Gletscherstaffel it began to rain, and the guides said they did not like the idea of going on. So I suggested we should stop and lunch. During this the weather got somewhat brighter again, and the guides said they would go on. So at 11.30 A.M. we started again up the proper right bank of the Inner Pfafflerthal. At 1.50 P.M. we reached the glacier and put on the rope, and at 4 P.M. reached the col of the Wetterlücke, the going having been rather heavy through soft snow. Snow had come on shortly before this, so we did not halt, but made our way straight down. The Breithorn glacier was very broken and intricate (Johann Kaufmann said more so than he had ever seen it before), but Kaufmann led with great skill, and we got off the glacier at 6.10 P.M., and reached the Steinberg Alp at 7.20 P.M., wet through, as the snow had turned to rain lower down, but delighted with the success of the expedition.

The next day my appearance going down from the Steinberg Alp to Lauterbrunnen must have been edifying, with an ice-axe in one hand and a huge gamp in the other, which I borrowed at the chalet, not liking the idea of getting wet through before driving from Lauterbrunnen to Grindelwald. I became a full convert to Mr. Ball's faith in the virtues of umbrellas. E. CLAYTON.

THE MATTEN LIMMI.—With Hans and Melchior Kohler, of Meiringen, as guide and porter, I left Rosenlaui at 2.30 P.M. on July 29, and reaching the Dossen Hütte at 6.15 P.M. passed the night there.

Starting next morning soon after sunrise, in cloudy weather, and descending slightly to the left over patches of snow, a few rocks, and flowery pastures to some chalets, we turned sharply to the right across the stream of the Renfen Glacier, and, keeping high above the Urbach, rounded the ridge from the Tellengrat, and arrived at the Matten Alp at 8.30 A.M. Here hot coffee was obtained; and as clouds hid the spot at which it was necessary to strike the ridge, and the proposed pass was unknown to Kohler, it was thought desirable to take a herdsman as far as the col. Crossing the main stream, and bearing to the left up very steep grass slopes, succeeded by several stony gullies on the right, the Matten Limmi, just south of and perhaps identical with the spot marked 2,761 mètres (9,059 feet) on the Siegfried map, was easily gained, the time occupied from the chalets, now immediately beneath, being about two hours.

The mists had cleared away, revealing a gap so narrow that one person alone could pass through at a time, thus recalling the early descriptions of the Trift Joch from Zermatt to Zinal. The view of the Gauli Glacier and its moraines, of the Ewig Schneehorn, Wetterhörner, and of the Hangend, Renfen, Dossen, and Stellihörner was extremely interesting. Far below, on the side of the Hasli Thal, Guttannen, with its new road and green pastures, seemed within a stone's throw. A jagged ridge rose up to the Ritzlihorn; whilst a steep pinnacle, of

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which the eastern face descended in a sheer precipice to a snow couloir, shut out all view to the north.

This couloir proved impassable, so roping up and clambering round to the right, the descent was commenced amongst overhanging rocks, the broken state of which rendered progress very slow. It was evident the pass was seldom if ever used; large masses had to be dislodged to gain foot- and handhold. At last the slope became less steep, all difficulties ceased, and a short halt was made. Starting again and bearing northwards, numerous ridges and gullies were crossed: these led the party to steep beds of very hard avalanche snow, requiring some little care and step-cutting. Stones kept falling, and on arriving at the lowest slopes they were found entirely covered with recent *débris*.

Guttannen was reached about 4 P.M., the entire passage thus having occupied about eleven hours. It is thought nine hours should suffice. I had intended to mount to the Gelmer Limmi the following day, but snow and heavy rain, lasting forty-eight hours, prevented this extension of the expedition.

This pass, combined with the Furtwang Sattel and the Stein Limmi, offers a pleasant route from Grindelwald to the Stein Alp, and thence by the Wendenjoch to Engelberg. J. B. CARRINGTON.

WINTER MOUNTAINEERING.—The splendid weather which prevailed in the Alpine regions during the months of December and January—a marvellous contrast to the gloom and cold of the preceding summer—naturally induced mountaineers to undertake ascents, which were carried out under unusually favourable circumstances. On December 5, Herr Diamantidi, with Peter Dangl and seven other Sulden guides, went up the Ortler Spitze in 4¼ hours from the Payerhütte, without any great difficulty, the ascent being repeated on December 12 by Herr H. Petermann. Herr Schöllhorn climbed the Gross Watzmann (December 9), and the Dachstein (December 26); two ascents of the Zugspitze (December 26 and 28), as well as one of the Gross Venediger (January 2), and of the Fleckistock (Uri) being also recorded. On January 10 a tourist was killed on the Hohe Kasten Appenzell.

The principal winter ascents of which we have heard were those made from Grindelwald by certain energetic members of the merry party which enjoyed this winter again the hospitality of the 'Bear'—or, rather, of the Bosses in the new house known as the 'Little Bear.' On January 2 Messrs. Cornish and Lefroy, with Ulrich and Hans Almer and Christian Jossi, made the third winter ascent of the Schreckhorn, and on January 8 the same party (except Jossi) climbed the Wetterhorn. On January 3 Mr. A. C. Tosswill, with Ulrich Kaufmann, Johann Bernet, and Johann Burgener, repeated the ascent of the Schreckhorn, and were back at Grindelwald the same afternoon at 5 P.M. A third party aiming at the same peak on January 10 did not get further than the Schwarzegg hut, for that day the weather began to break, and on January 11 a heavy snowstorm raged. A few days later Mr. Littledale made up for his enforced retreat; for on January 16, with Ulrich Almer and Christian Roth, he climbed the Schreckhorn, and on January 19, with the same guides and Hans

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Almer, the Mönch, in both cases returning to Grindelwald the same evening. On January 16 an English gentleman, with Christian Jossi and Johann Kaufmann, starting from the Schwarzegg hut, attempted the ascent of the Finsteraarhorn by way of the Agassizjoch. Intense cold and bad snow in the great couloir of the Joch compelled the party to retreat, after having climbed a few hundred feet up the arête above the Agassizjoch.

Less adventurous members of the 'Bear' party contented themselves with ascending the Faulhorn, crossing the Wengern Alp, and making the other ordinary excursions from Grindelwald. The weather was most magnificent, and the heat often oppressive in the day-time. 'Tobogganing' and sleighing were the order of the day, while the flooding of the lawn-tennis ground induced an energetic and well-known climber to organise and daily lead most exciting games of hockey on the ice, in which the most prominent performers only were equipped with skates. The thrilling adventures of the players were watched with the greatest interest by the villagers, to whom this game was an entire novelty, and who were particularly delighted by the performances of a celebrated Saas guide then making his début as a skater and a hockey player. The merry incidents of the hockey ground and toboggan slide will long remain in the memory of those who beheld them—longer even, perhaps, than the cheering beverage called 'Gletscherthee' (perhaps because tea was the least of the many ingredients which it contained) provided by the ever-thoughtful hosts of the 'Bear,' who, as usual, devoted all their powers to amuse and entertain their guests. The dogs, as on a previous occasion, took part in many of the minor ascents, 'Hunter' again bearing away all the chief honours as a reward for his pluck and perseverance, though scarcely for his beauty.

The marked feature of the Grindelwald winter season was the small quantity of snow. Up to January 11 the village was reached by wheeled vehicles only, sleighs being quite useless. The parties who went up to the Schwarzegg hut took the summer route by way of the Bärenegg, Zäsenberg and 'Enge,' while the one Bergli party having reached its sleeping quarters by way of the Zäsenberg came back over the Kalliberg. A party which crossed the Wengern Alp to Lauterbrunnen on January 15 took 6 hrs. 40 min. walking from one village to another, following the summer path throughout, save in one bit near Alpiglen, and finding very little snow between the Bellevue and Jungfrau hôtels.

Death of Ulrich Kaufmann.—On January 11 last, there passed to his rest one of the older generation of the Grindelwald guides—Ulrich Kaufmann, (who must not be confounded with a younger man of the same name, known by his ascents in New Zealand and the Himalayas). Kaufmann, and his brother-in-law Christian Almer, were the two chamois hunters who joined Mr. Wills' party on the way up the Wetterhorn during the famous ascent of September 17, 1854. He was also with Almer on the first ascents of the Mönch (1857), and of the Gross Viescherhorn (1862), as well as on the first passage of the Jungfraujoch (1862).

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SIGNOR SELLA'S DAUPHINÉ PHOTOGRAPHS.—Signor Vittorio Sella is among the very few mountaineers who were in luck last year. He had made up his mind to climb and photograph the great peaks of the Dauphiné Alps, and his fortnight's sojourn in the district included that wonderful week (August 8–15) which was the one bright spot in the long gloomy summer. Consequently, he was enabled to take many magnificent views in the clearest weather. His collection (now numbering 534 views) has thus been enriched by no fewer than fifty-eight large photographs (16 inches by 11½ inches), which are of the greatest beauty and of the highest value. They include complete panoramas from the summits of the Ecrins (3 bits), the Meije (5 bits), the Pelvoux (5 bits), the Pic Coolidge (4 bits), the Grande Ruine (4 bits), and the Sommet des Rouies (5 bits). Amidst so many splendid representations of the ice and snow regions it is hard to pick and choose, and everyone will have his own favourite views. Several good judges are however unanimous in adjudging the palm to a most superb view of Les Bans from the Col du Sélé (No. 530), which is certainly a most impressive portrait of a single great peak rising beyond a great crevassed glacier. Next to this, perhaps, comes a most delicate representation of the final cone of the Sommet des Rouies (No. 484), the fluting of the snow slopes being most admirably portrayed. A view taken on the way up the Ecrins, and looking north (No. 512) is remarkable for the harmonious and artistic treatment of four ridges, rising gradually in height one behind the other, the eye being insensibly, yet irresistibly, carried up to the loftiest peak of the Meije. No. 488 is a most successful representation of a most difficult subject, the wall of the Meije from the Vallon des Etançons, for, as it is taken from a point some way above the level of the valley, the real height of the great wall comes out extremely well, whereas in ordinary views it is generally dwarfed and foreshortened. The sight of the Pic Bourcet from near the Col de la Casse Déserte (No. 494) will make ambitious peak climbers regret that they had not seen it before Mr. Swan conquered the peak in 1887. There are two most startling views taken from the Pyramide Duhamel on the Meije (Nos. 501 and 503), and the well-known, but none the less marvellous, appearance of the Pic Central of the Meije from the Grand Pic, with the four great teeth between (overcome by the Zsigmondy party in 1885), may be studied at leisure in No. 497. Among special views we may note further those of the Olan from the Rouies (No. 482), of the Pelvoux from the Refuge Tuckett (No. 511), of the Ailetroide from the summit of the Ecrins (No. 514), of the Ecrins from the north and from the south (Nos. 516 and 491). An admirable view of the typical valley of Dauphiné, the Etançons Valley, is afforded in No. 487, while Nos. 518, 485, and 486 are charming studies of crevasses. It may be affirmed without fear of contradiction that Signor Sella's artistic skill and taste have never been better shown than in this marvellous series, which will be the joy of all who know Dauphiné, and a revelation to all who do not yet know it, while for topographical purposes its value is simply inestimable. The price of forty of these wonderful photographs is nine francs each, the eighteen others being

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only six francs apiece. Such a complete and *cheap* set of views of a limited district of the higher ice and snow regions has probably never before been offered to the public, and I trust that Signor Sella's skill and taste may meet with the reward which they so fully deserve.

W. A. B. Coolidge.

State Intervention in Alpine Matters.—The truism that Continental Governments interfere with everyday matters far more than English officials would venture to do has recently been illustrated by two incidents—both amusing and instructive—which have lately taken place in Austria and in Italy.

It seems that about the beginning of September certain persons conceived the idea of erecting a monument in honour of the 40th anniversary of the accession of the Emperor of Austria, and proposed to erect it on the summit of the Ortler Spitze—the highest point in his dominions—where, too, it was proposed to have, on the joyful day itself, a festive gathering, bonfires, &c. This design seems to have been promoted with blissful ignorance of the obvious fact that the practical difficulties of raising the monument (a stone pillar nearly 50 feet high, and weighing over 3,000 pounds) on such an elevated snowy peak were well-nigh insuperable, but also of the not less important fact—and one certainly not less obvious—that on December 2, the day in question, a festivity by night on the Ortler Spitze meant a night spent in the open at a great height. It is impossible to imagine that anyone possessing the merest smattering of mountain experience was on the committee charged with carrying out this remarkable scheme, and, indeed, we believe that the Alpine societies and club sections which have their headquarters in Vienna and Innsbruck discountenanced it to the best of their power. However, the difficulties above indicated were not after all encountered, for on arrival of the monument near the foot of the peak, early in November, the Meran local officials forbade its further transport. The monument committee appealed in turn to the Governor of the Tyrol and to the Austrian Minister of the Interior, but in vain. Hence it has been decided to postpone the erection of the obelisk till August 18 next, the Kaiser's birthday. It is worth noting that the President of the Innsbruck section of the German and Austrian Alpine Club refused to countenance the scheme in a very emphatic letter written on behalf of the section, and correcting many misstatements of the monument committee as to Alpine matters. The reasons assigned by the Governor of the Tyrol for the rejection of the appeal addressed to him are the excellent ones that the transport of the monument to such a spot in December would be attended with serious risk, if not loss, of life, and that the public opinion of the district, apart from the interested advocacy of certain guides, was opposed to the scheme. An attempt was ultimately made to set up a wooden replica of the obelisk on the peak, but it snowed hard all day on December 2, and on December 4 the caravan of forty persons gave up the project after having attained a point but a little further than the Payerhütte. The honorary president of the obelisk committee, Herr Diamantidi, made the ascent on December 5, and hoisted an Austrian flag on the summit, but, we understand, immediately resigned his office on his return to Meran. It may be hoped

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that the last has now been heard of this obelisk project, which could only have originated with persons entirely unacquainted with practical mountaineering.

The foreign system of requiring all workmen to possess recommendation books issued by and controlled by the local government applies, as is well known, to guides in all parts of the Alps. The Italian Chamber of Deputies in the course of last November debated a law respecting the public safety, which dealt among other professions as to which police registration is necessary, with that of guides, under the heading, 'Mestieri girovaghi,' which one might English literally as 'vagabond professions.' Signor Brunialti, a well-known member of the Italian Alpine Club, and also of the Chamber of Deputies, secured from the Government the concession that 'guides' should be named before 'valets de place,' but failed in his endeavour to procure the insertion of a clause providing that in the case of a professional person, in whose charge the lives of other persons were placed, the certificate of registration should be issued by the Prefect or some other high official. It was explained, however, that this refusal was based solely on the ground that the code of regulations to be issued in order to carry out the statute would contain a clause dealing with this point, and this explanation induced Signor Brunialti to withdraw his proposal.

Who can tell if the time may not come when the question of erecting a monument on Helvellyn or Snowdon, or the licensing of guides for the Cumbrian or Cambrian districts of the British Alps, will be solemnly considered by local officials or debated at Westminster?

THE NEW SURVEY OF THE TYROL.—In No. 13, page 155, of the 'Oesterreichische Touristen-Zeitung' for 1888 (now edited by Herr Julius Meurer), we find the results (in mètres) of the most recent official survey for the new map of the Tyrol. They supplement the figures for the Dolomites given in our August number (page 61).

—	New Height	Old Height	—	New Height	Old Height
Ortler . .	3,902	3,905	Monte Vioz .	3,644	3,631
Königsspitze .	3,857	3,854	Monte Saline .	3,621	3,620
Monte Cevedale	3,774	3,795	Presanella .	3,564	3,561
Monte Zebru .	3,740	3,740	Monte Gabbiol	3,475	3,410
Pallon della Mare	3,705	3,784	Caré Alto .	3,465	3,461
Punta di San Matteo . .	3,692	3,633	Tuckettspitze .	3,458	3,475
Gr. Venediger .	3,660	3,673	Payerspitze .	3,396	3,444
Thurwieserspitze	3,648	3,658	Marmolata .	3,360	3,494

The variations in many of the peaks are, it will be seen, only such as must take place by the changes of seasons. They are real variations probably, rather than corrections in measurement. But in a few cases substantial changes have been made.

The Monte Cevedale, Pallon della Mare, Payerspitze, and particularly the Marmolata (which still ranks, however, as the highest of the Dolomites), have specially to rue this new measurement; on the other hand, the Punta di San Matteo and Monte Gabbiol gain considerably.

In No. 22 (p. 268) of the 'Mittheilungen' of the German and

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Austrian Club for 1888, the new heights of two other great peaks of the Tyrol (surveyed last summer) are given:

——	New Height	Old Height
Wildspitze (N. peak) . .	3,784	3,776
„ (S. peak) . .	3,779	3,770
Weisskugel	3,746	3,741

The new height of the Gross Glockner (old height 3,797) does not seem to have been yet made known.

The following figures relating to the Brenta Dolomites are taken from a list in No. 13 of the 'Mittheilungen' for 1888, page 157:

——	New Height	Old Height
Cima d'Ambies . . .	3,095	—
Bocca d'Ambies . . .	2,871	—
Cima Tosa	3,176	3,179
Crozzon di Brenta . . .	3,123	3,090
Bocca di Brenta . . .	2,553	2,547
Cima Brenta Alta . . .	2,967	3,036
Torre di Brenta . . .	3,024	3,065
Cima Brenta	3,155	3,146
Cima Vallesinella . . .	3,121	3,121
Cima Falkner	2,989	3,013

The long-standing feud for superiority between the Cima Tosa and the Cima Brenta is thus officially settled in favour of the former, which was generally considered to be the higher.* The Cima Brenta Alta and the Torre di Brenta lose considerably, while the Crozzon di Brenta gains over 100 feet.

An Ascent in West Africa.—In the *Graphic* for September 15 last Mr. H. H. Johnston, the well-known explorer, gives a very vivid and interesting sketch, illustrated by a number of engravings, of his ascent of the highest peak of the Cameroons mountains, forming part of the German possessions on the West Coast of Africa. He started from his permanent headquarters on the green island of Mondole, in Ambas Bay, in the rainy season of the year, in order to examine more carefully the wonderful flora of the district. After halts at the villages of Bonjongo (2,200 feet) and Mapanja (3,300), Mr. Johnston, with the usual retinue of native porters, started for Mann's Spring, one of the few ascertained sources of water flowing down from the main peak of the Cameroons. It is the limit beyond which few travellers penetrate, and takes its name from an English botanist who made the ascent of the peak with Captain (now Sir Richard) Burton. Mr. Johnston's descriptions of the marvellous plants then bursting into life again in the second spring are most fascinating. In one place there were countless orchids, many of them new to science; in another the party passed for 100 yards through a natural avenue of tree ferns. Birds, too, abounded.

* See Mr. Freshfield's *Italian Alps*, p. 268.

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At the height of about 5,000 feet a cold, wet mist came on, and diminished the charms of the excursion. Seven hours from Mapanja they reached a majestic forest, and soon after in a clearing reached Mann's Spring, where Mr. Johnston pitched his tent on a level platform, intended for the hunting lodge of a German judge, which was never built. This is at a height of 7,350 feet, the temperature varying from 50° to 65° Fahrenheit. Here Mr. Johnston appears to have spent some time exploring the neighbourhood, collecting specimens, and enjoying wonderful views down on the sea and the island of Fernando Po from the summit of an old crater close by the encampment. The next stage in the journey was up to 'Hunter's Hut' (8,300 feet), in a narrow peninsula of forest pushed up the mountain side. On this spot four little huts were built, and provisions obtained from the mountain people of Bwea. It was from this point that the start was made for the final peak. Leaving at 8 A.M. in the rain, Mr. Johnston and his companions crossed several lava fields, and gained the spot where he pitched his tent at 11 (height 10,500 feet). His native attendants were now sent back to Hunter's Hut, as they suffered so much from the cold, Mr. Johnston retaining only two men. About noon the weather cleared, and the highest peak stood out magnificently distinguished from his brownish-green neighbours by his gorgeous colouring—red, yellow, mauve, greenish grey, gold, purple. It presented itself as a triple crater, the highest peak being in the centre. Mr. Johnston's admiration of this grand sight was broken in on by the terrors of his two companions, who stood in great fear of Ehwasu, the spirit of the mountain, and advised him to surrender his rifle if the spirit should demand it. Starting off again alone at 3 P.M., Mr. Johnston passed over grassy downs, then over loose ashes and lava beds, the walking being very fatiguing. In part, these *scoriæ* were covered with mosses of various colours or dull green grass. The ascent, however, offered no difficulties, being like that of Dunkerry Beacon or one of the North Devon Hills. On the summit Mr. Johnston took a boiling-point observation at 5.45 P.M., which makes the height to be 13,508 feet, which he believes to be nearer the truth than the usually accepted height of 13,760. Two small cairns, containing the names of some previous ascenders in 1884 and 1886, a bottle and a tin case, were found on the top. Time did not allow of a visit to the western crater, which may be higher than the central one, though the latter is the one usually visited. The view was very superb, but advancing night compelled a speedy descent. The ascent of the final peak had taken half an hour, but going down Mr. Johnston took only five minutes, making a sort of glissade over soft snow, and clean, crisp cinder dust. Unluckily, however, he lost his way lower down: he had forgotten his compass on top, and also an orange, the want of which was very painful, as no water was to be found. After many hours' wanderings, during which he must have passed close to the camp, the frostiness of the air and wet clothing making it inadvisable to lie down and sleep, Mr. Johnston found himself at a height of 6,000 feet, and on the verge of the great forest. A steep descent forced him to await the dawn, but the sublime sight of the sunrise made him forget all his fatigues.

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Finally, he found a path which led him back to Hunter's Hut; but he does not tell us what became of his two companions or his tent.

The ascent seems to have been made several times before, but it is well to have it described again, that we may realise the existence in Western Africa of a peak about as high as the Jungfrau or the Aiguille Verte.

REVIEWS AND NOTICES.

Souvenirs d'un Montagnard, 1858–1888. Par le C^te^ Henry Russell. (Vignancour: Pau, 1888. 8vo., pp. xx., 508. 5 francs.)

AFTER thirty years' experience of the Pyrenees, Count Henry Russell has given us an account of his ascents, going right through the chain from east to west. He professes to give mere geographical exploration, unaccompanied by botanical or geological discoveries, and in the hands of most of us a mass of dry detail would be the result, of the nature of a guide-book, which could hardly prove interesting reading when taken up at home. This, however, is not the case with the present work; we have a vein of subjective reflections running through it, which redeems it from any dulness or monotony, and makes it delightful reading for any one who has the fortune to be acquainted with the Pyrenees and with the author. Indeed, an acquaintance with Count Russell is almost a corollary of knowing the Pyrenees, more especially since he has made his three caves on the summit of the Vignemale, besides a fourth one half way up the mountain for the 'fainéants.' In the winter the upper caves are buried beneath the snow, and it is only late in the summer that they become accessible; but regularly towards the end of July this ardent mountaineer betakes himself to his summer chalet. Here, at a height of 3,200 mètres, cut off from the world by the largest glacier in the Pyrenees, he spends days and even weeks, alternately wooing the charms of solitude and dispensing hospitality to any friends who make the ascent from Gavarnie, and a sketch of Count Russell in his cave on the Vignemale would be an interesting addition to 'Celebrities at Home.' In these caves on the Vignemale we have the key to the spirit which has inspired Russell in his devotion to the mountains, winter and summer, for thirty years.

In the number of first ascents recorded in these 'souvenirs,' both on the French and Spanish side of the chain, and these made at a time when the latter was almost a *terra incognita*, we can trace the passion for exploring which impelled the author of 'Seize mille lieues sur l'Asie et l'Océanie.'

In these mountain ascents, often undertaken alone, the writer candidly admits (p. 281) 'l'amour propre mêlé à la passion plus noble de l'inconnu m'y fit escalader.' The ascent of Mont Perdu (p. 326), accomplished without companions thirty years ago, which was followed by a night in a snowstorm on the Brêche de Roland and a difficult descent through a dense fog to Gavarnie, with the sound of the cascade as the only guide, is a feat that few would have had the hardihood to

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attempt, and none could have succeeded in without the mountaineering instinct.

It is not, however, as a peak-hunter, but as a true mountain lover, that Count Russell offers his book to the Club, and as a protest against the increasing number of members who look solely to making a successful ascent, blind and deaf to all else concerning it. There is probably no member of the Club who has passed as many night bivouacs on the mountains as Count Russell. Since he first began to climb, his campings out under rocks, trees, or stars must be reckoned by many hundreds—occasionally for eight or ten consecutive nights—and the *morale* of the book is to show that it is impossible to get a real acquaintance, much more love for the mountains, without assimilating yourself with them in this semi-savage life. 'Un montagnard aime toujours la nature, tant qu'elle n'a pas été défigurée par l'homme' (p. 428). For this the Spanish Pyrenees are peculiarly fitted. In a few hours one escapes entirely from the haunts of man, without passing into a too inhospitable region; and the upland sheets of water, half tarn, half lake, so prevalent at heights of 2,000 to 3,000 mètres, give a charm to these mountains entirely wanting in the Alps.

For a charming picture of the 'magnetism' of this kind of life see (p. 401) the account of a night on the Col d'Eristé, on the south flank of Pic Posets, of which Russell writes: 'Je n'oublierai jamais cette soirée-là, quoique j'en aie vu de belles dans tous les coins du globe.' And with truth can Russell say this; for, having seen the Andes of Peru, the Himalaya, the mountains of New Zealand, the Alps, and the Altai, after thirty-five years passed in the adoration of the mountains (p. 456), he thus sums up his impressions: 'Je crois encore avoir raison en admirant plus que jamais les Pyrénées. . . . Il y a dans la nature Pyrénéenne une poésie extrême, une harmonie de formes et de couleurs, et des contrastes que je n'ai vus nulle part ailleurs. Quant à la neige, il y en a juste assez; les Andes en manquent, et les Alpes en abusent. . . .' And again (p. 444): 'Comme ils jugent mal les Pyrénées, les touristes prosaïques qui, au Port du Vénasque, s'assoient autour d'un bon dîner en face de la Maladetta, la regardant souvent moins que leur poulet ou leur journal! . . . Même ceux qui montent sur le Néthou sans faire autre chose, ne comprennent rien aux Pyrénées. Pour cela il faut passer au moins trois ou quatre jours dans les vallées de neige qui, rayonnant au sud des Monts-Maudits, se couvrent bientôt, à perte de vue, d'énormes sapins et de fleurs merveilleuses, à mesure qu'elles descendent," and again (p. 401), "Dans la vallée de Malibierne, la Russie semble toucher à l'Espagne . . . un monde de granit; plein de mystère, de fleurs, de sources, et de sapins. C'est une nature *Malibiernique*.' Those who know these gorges will appreciate the epithet.

The arrangement of the book according to the topographical succession of the peaks has the advantage of facilitating reference, but it would have been, perhaps, more interesting to trace the order in which the ascents were made, especially as not a few of them were undertaken alone. Indeed, as a practical mountaineer, Count Russell advances some views which the present writer entirely shares, though at

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variance with those commonly advocated, perhaps *ex abundantiâ cautelæ*. In the first place, as to going alone. Though Russell would be the last to counsel the crossing of a glacier or the ascent of difficult rocks unaccompanied, or any lonely pass voluntarily undertaken in bad weather, especially by those who are no longer young, he insists (and who that has tried it does not feel the same?) that there are certain pleasurable sensations only to be experienced when on the mountains alone, and that this is the only school for acquiring the necessary self-confidence. 'C'est un bonheur d'être deux, c'est une leçon d'être seul' (introd. xiii). Then, again, on the use of the rope. Though entirely in accord with the necessity of its use on the crevassed glacier, Count Russell thinks that being attached on precipitous rocks, or even on a steeply inclined talus of ice, only tends to increase the danger in proportion to the numbers composing the party, and that every one ought to stand or fall in climbing on his own merits. Be that as it may, we shall all agree with him in attributing by far the larger portion of the accidents on the mountains to the folly or inexperience of those attempting them.

To the oft-repeated question of what pleasure can there possibly be in mountaineering, there can be no better answer than the perusal of these 'souvenirs.' 'Exclusivement épris du Beau, il n'a pas vu autre chose dans la Nature, qui l'a ensorcelé' (Introduction, p. v.). But besides conveying the impressions of the author in a charming manner peculiarly his own, the book has an especial value as a record of some of the earliest explorations of the Pyrenees, when even on the French side the map of the Etat Major had not appeared, and when the mountains and gorges of Aragon and Catalonia, since so well illustrated by the labours of Schrader, Wallon, and others, were only here and there traversed by contrabandists, and unknown to the mountaineer.

C. Packe.

Jahrbuch des Schweizer Alpenclub, vol. xxiii. 1887–8. (Bern.)

In this volume, for the third time since the formation of the S. A. C., there is no portion specially devoted to the 'Clubgebiet.' In Vols. VI. and IX. this arose from lack of material, but on this occasion it was caused simply by the delay in sending in articles. Whilst referring to this in the preface, the editor takes occasion to remind the 'Vorstände' of the sections that men should not be put on the list of guides merely because they have passed the 'Führer-Kurs' and 'examen,' apart from their practical qualifications, as evidenced by their certificates.

Most of the new excursions have already been recorded in the pages of the *Alpine Journal*; the others are mostly the ascents of subordinate peaks or of known peaks by new routes. One of the peaks of the Gelmerhörner (3,166 mètres=10,363 feet) was climbed for the first time in mistake for the Thieralplistock by Pfarrer H. Baumgartner.

The loss of a night's rest is not a good preparation for a mountain ascent; but Herr C. Seelig (Section Uto) in the summer of 1887 made good use of his Sundays in the Geschenen Thal. Beginning with the

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comparatively easy passes of the Alpiglen Lücke and Winter Lücke, he finished up with some difficult excursions in the mountain ridge that rises so steeply above the Damma Firn and the Kehlen Glacier. On July 31, 1887, on an ascent of the Dammastock, accompanied by Jos. Zgraggen of Amsteg, after gaining the ridge with much difficulty they were confronted by a nearly vertical cliff of névé, 40 feet high, up which Zgraggen boldly and cleverly made his way, boring deep hand-holds, to a point where the cornice was broken away. On September 5 they effected the first ascent of the Winterstock (3,231 mètres = 10,601 feet), and made the difficult descent by the Tiefen Glacier to the Tiefen Hôtel, on the Furca road. At one point on this mountain the party was in a most critical position. The way was barred by two great slabs leaning against each other. They were both in the passage when Zgraggen pushed aside a stone which impeded him. On this both the slabs, to their intense terror, began to move with a fearful grinding noise. The motion ceased almost immediately, and the slabs had probably only slid into a more stable position; but for many seconds they dared not move, and at last crept out with beating hearts, thankful for their narrow escape.

The Grosse Wendenstock (3,044 mètres=9,987 feet) for the first time finds an historian (Herr Behn) in the 'Jahrbuch.' This rather difficult mountain, S.W. of the Titlis, has been very seldom ascended. It is approached from Engstlen by the Pfaffen Glacier. The ascent to the ridge is steep, and the passage of the final Scharte requires an accomplished climber. Herr Behn does not seem to be aware that the first ascent of the peak was made as long ago as July 26, 1873, by Mr. T. C. V. Bastow (see *Alpine Journal*, vol. vi. p. 299).

The passage of the Jägerhorn from Macugnaga to the Riffel by Dr. Curtius, with the guide Klucker, followed in the main the routes of earlier explorers. They encountered an enormous amount of soft snow in the descent, and the Riffel Hôtel was only reached after 7 hours' hard work.

The most interesting, perhaps, of the ascents is that of the Dent d'Hérens, made on September 6, 1886, by Herr A. Lorria and Mr. C. Townley, with the guides Del Ponte (Zurbrücken) and Gentinetta. This is a curious instance of a mountain expedition made avowedly with the object of finding a route which should be free from the danger of falling stones, whilst on the same day the party deliberately engaged themselves on the descent in a route notorious for such dangers. They left the Stockje hut at 3.15 A.M., and at 6.15 were on the Tiefenmatten Joch. They descended and traversed the glacier on the south side to avoid some formidable 'Zacken,' and gained the W. ridge at 7.20. Soon two formidable 'Gendarmes' seemed to render further progress impossible. Mr. Townley and Del Ponte first worked their way round the first 'Gendarme,' watched anxiously by the others. Then Gentinetta followed, and disappeared round the angle as far as the rope would reach. The ticklish nature of the position may be inferred from the fact that to both Herr Lorria's questions, 'Are you fast?' and 'Can you draw in the rope as I advance?' the guide replied in the negative. Foothold and hand-

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hold were of the slightest; straining and panting Herr Lorria worked his way round, and joined Gentinetta in his insecure position, and after a hard struggle they regained the ridge. In like fashion the second 'Gendarme' was circumvented, and the summit was then reached without much further difficulty at 10.10 A.M. As the usual line of descent was exposed to falling stones, they tried the S.W. ridge, and without encountering any very serious difficulty reached the Zan de Zan glacier at 12.20. At 12.40 they were once more below the Tiefenmatten Joch. Here, to avoid the long circuit by the Col de la Valpelline, they determined (it must be said against Herr Lorria's advice) to attempt the descent by the morning's route in spite of the known danger. Arriving at the dreaded 'Stein-Rinne' in the couloir, Gentinetta, to save time, instead of cutting steps, crossed on the pebbles fixed in the ice. Mr. Townley followed, and, quickening his pace on the snow, the rope was suddenly tightened between him and Herr Lorria. The latter lost his balance, fell down the 'Rinne,' and dragged Mr. Townley after him. Fortunately both the guides were on the snow, and they held fast. They, however, lost their heads, and forgetting that their Herren were hanging helpless on the ice-slope, kept calling, 'Come, and quickly!' Only when Herr Lorria shouted did Gentinetta draw in the rope, and they were extricated from their unpleasant position. In a few minutes they had passed the Bergschrund, and were safe on the glacier below. In spite of their dangerous adventure, the 150 mètres (492 feet) from the Joch had been passed in 15 minutes. (Dr. P. Güssfeldt made the same excursion by the same route the next day. As his party reached the dreaded couloir on the descent, a great stone avalanche swept down the 'Rinne,' but availing themselves of the pause which invariably follows they crossed in safety.)

Here we see that overhaste to avoid the danger of falling stones may be as dangerous as the stones themselves. The best course for tourists wishing to ascend the mountain from Zermatt would be to cross it to some other place, if they were not prepared on the descent to make the long *détour* by the Col de la Valpelline. The proper starting point in fact is not Zermatt, but Prarayen.

M. Martel, well known for his careful study of the Mont Blanc range, contributes a paper on two excursions in that district. In view of the much-disputed question of the relative advantages of the Chamonix and St. Gervais routes, he personally examined both, and came to the conclusion that the ascent by the Aiguille du Goûter is less fatiguing, more difficult, more dangerous, but also much more interesting, than the ascent by the Grands Mulets. However, since in case of bad weather on the second day the descent from the cabane on the Aiguille becomes really difficult, the St. Gervais route can never seriously compete with that from Chamonix. He next gives a short account of an ascent of the Aiguille d'Argentière, to which is prefixed a complete list of the peaks which surround the glacier of that name, with their respective first ascents. The Tour des Courtes is not yet ascended. The ascents of these peaks has been much facilitated by the erection (in 1881) of the Pavillon de Lognan (2,033 mètres=6,667 feet), reached in 4 hrs. from Chamonix.

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The general treatises ('Abhandlungen') are of more than usual interest. Three of them, by M. Antoine de Torrenté on the 'Forêts et Avalanches de la vallée de Conches,' by Herr H. Aebi on the 'Wasserbauten des Berner Oberlandes,' and Herr F. Marti on the 'Verbauungen und Aufforstungen im Forstkreis Interlaken,' supply us with a picture of the efforts which are now being more systematically made to counteract the destruction to life and property wrought by avalanches and torrents. It was once thought enough to forbid the cutting down of trees in the protecting forests (Bannwald), but experience showed that these, if neglected, decayed and became unable to resist the rush of the avalanche. Judicious thinning out of old trees and replanting was necessary to keep the wood in a healthy condition. Where the woods have been destroyed and cannot be replanted, endeavours are now made to form artificial terraces (Bermen) on the dangerous slopes, so as to prevent the starting of the mass of snow. Where the ground is rocky these terraces must be constructed of stonework. On slopes which can be replanted, piles are driven in, and connected by wattling. In the interstices young trees are planted, and it is hoped that when the piles have decayed the young trees will have attained a useful size. The slopes above the villages of Obergestelen and Geschenen, which are the most exposed, were treated in this manner in the years 1877–8 at a cost of about 13,000 francs. In places where the ground is eaten away in the upper courses of the steep mountain torrents a similar course must be adopted. Where the soil is thin, walls must be built at suitable points to support it. Where it is deep enough, the system of piles joined by wattling must be adopted, and everywhere not only must young trees be planted, but various kinds of grasses must be sown where the soil is not deep enough for trees. The courses of the torrents themselves must also be broken by the building of terraces of masonry (Thalsperren) across them to break the rush of the water. On the north side of the Brienzer See there are more than twenty streams. Of these the courses of the Herdig Graben, which specially threatens Goldswyl, and the Schwarzfall Graben above Ringgenberg, were thus treated in the autumn of 1886 and the spring of 1887. On December 8, 9, and 10, 1887, a sudden Föhn wind melted the snow up to a height of 2,000 mètres. Whilst all the other Gräben sent down as usual a great deal of rubbish, and did much damage, these two sent down only clear water, which did no harm. In the Bernese Oberland the rectification in this fashion of the Aar and its numerous tributaries will be a great and costly undertaking. The Federal Government undertakes 40 per cent. of the cost, the Canton 33½ per cent., while the local communes have to pay the rest. The peasantry were at first much discontented with the arrangements, especially with the restrictions about pasturing goats, &c., where the young trees, &c., were planted; but the sight of the good results has reconciled them to the course adopted.

Mr. Philip Gosset, the well-known Federal engineer, has gathered together all the available information about the Märjelen See. This remarkable lake, which is surrounded on three sides by land, and on the fourth by the Aletsch Glacier, has its natural outlet under the glacier.

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This channel, however, is often completely blocked for long periods, and the lake then rises until its waters find an outlet towards the valley of Viesch. The level of the surface, when full, is 2,367 mètres (=7,766 feet) above the sea level, and that of the point of outflow under the Aletsch Glacier 2,320 mètres (= 7,612 feet), giving thus a maximum depth of 47 mètres (= 154 feet) close to the glacier. The volume of water, when full, is estimated at 10,300,000 cubic mètres. Mr. Gosset ascertained that between 1813 and 1862 the lake emptied itself four times; and between 1864 and 1887 twelve times. It is probable that the evacuations were much more numerous during the earlier period of forty-eight years. Even during the shorter period of twenty-three years it was not possible to arrive at any accurate statement. Neither could any clear data be obtained so as to fix the period between low and high water, or the time during which it remained full. Both of these are most likely quite uncertain, and depend upon a variety of factors, such as weather, temperature, condition of the glacier, &c. Often as the evacuation has taken place, the accompanying phenomena have seldom been minutely observed. In July 1864, the lake emptied itself very quickly, so that a boat was carried under the ice. In 1873 the water passed off under the ice in eight hours. Loud detonations like thunder were heard, and vast shoots of water were ejected from the cracks in the glacier. In 1878 (July 18 and 19) it emptied itself in thirty hours and a half. The outflow commenced at 8 A.M. During the first eight hours the surface sank 1 mètre, and 402,000 cubic mètres flowed out; in the next thirteen hours and a half the surface sank 3 mètres, and 1,530,000 cubic mètres flowed out; while in the following nine hours 7,770,000 cubic mètres more flowed out, completely emptying the lake. In 1887 an evacuation commenced on September 1. In the first three days the level fell 4·15 mètres (= about 13½ feet), and on September 4 the lake was emptied in ten hours. From these two latter instances, it is plain that, when the outflow begins, the passages under the ice are rapidly enlarged by the warmer water until at last the lake empties itself with a kind of rush.* The outbreaks of the Märjelen See have always been a source of anxiety to the poor peasants of the Rhone Valley between the Mas a torrent and Brieg. The lake must have been to them like one of the fabled dragons, ready at any moment to burst forth and ravage their lands. In 1878 the Rhone above Brieg rose five feet. The 'Senn' from the Märjelen Alp used to carry the news, and received as a reward a pair of new shoes, but speed as he would the flood was always there before him. In the year 1883 it was proposed to deepen the channel to the Vieschertha, so as to lower the possible maximum level of the lake 12½ mètres (= 41 feet) and diminish the volume of water by 4,900,000 cubic mètres (nearly one-half). The danger from an outbreak would then be greatly diminished. The State consented to bear half

* This was the case with the lake which formed in 1819 behind the *débris* of the Gétroz Glacier. The tunnel which was driven to carry off the water was soon changed into a vast cutting, through which the lake was emptied, devastating the Val de Bagnes.

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the expense, but the canton and the communes interested had not, up to 1887, succeeded in coming to any agreement.

Most important and interesting is the article on the Relation of Gymnastics to Mountain Climbing, by Pfarrer H. Baumgartner (of Brienz), who has already written on this subject. The occasion of this article is the terrible accident on the Jungfrau on July 15, 1886. Of the six unfortunate victims nearly all were practised gymnasts, and two of them, Herren Ziegler and Bär, were first-rate. It is but too probable (he thinks) that over-great confidence in their ability to overcome difficulties led them to undertake the expedition which terminated so disastrously.

The writer begins by enumerating the various points in which gymnastics and mountain climbing resemble one another, and those in which they differ. He then points out that the four great qualities required of a mountaineer are endurance, activity, sureness of foot, and freedom from giddiness; that all of these qualities are developed by the practice of gymnastics, judiciously used, even in persons of a weak frame, and that therefore a person accustomed to these exercises must excel one unaccustomed to them in the technical part of mountaineering as distinguished from mere walking up hill. However, the practising of these exercises is not so useful to the mountaineer as they might be, because many of the performances so admired in gymnastic contests are not useful in mountain climbing, *e.g.* the balancing of the body on the hands, which is much practised, whilst balancing on the feet is entirely neglected. Others, again, are directly injurious, as the lifting and throwing of heavy weights, which make the legs thick and stiff, to the loss of their activity. If gymnastic exercises are to give their full benefit to the Alpine climber, they must be followed with that view alone. At present they are practised far more with a view to the winning of prizes in gymnastic contests than for any rational enjoyment or the improvement of health. Even when most judiciously used it must never be forgotten that there are many qualities needed for the mountain climber which the practice of gymnastics cannot supply, and which can only be attained by long experience in the mountain world, such as the power of finding the way where paths cease, of discerning the easiest approach to a mountain summit, the knowledge which leads in safety across a crevassed glacier or over slopes threatened by avalanches, the knowledge of the clouds and winds. Only professional guides possess these qualities in a high degree, and therefore in important expeditions they are absolutely indispensable. The mountaineer of experience is apt to think lightly of technical skill in overcoming difficulties, whilst the practical gymnast, strong in his capacity, undervalues the teaching of experience. Only from the union of the two can the perfect mountaineer arise. In conclusion Herr Baumgartner points out that many exercises may be practised without special apparatus which would be extremely useful.

It is only of late years that the practice of gymnastics has become almost universal. No German or Swiss town of any size is without its 'Turnhalle' and its 'Turnverein,' and possibly it is largely due to this that many mountain ascents are now executed with comparative ease,

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which were once thought difficult or impossible. But before this period we may reasonably suppose that the practice obtained in mountaineering by degrees educated both guides and tourists in the art of overcoming (though perhaps not with the grace of the practised gymnast) the difficulties which they encountered.

Professor Forel, as usual, gives many interesting details in his latest report on the periodical variations of the glaciers in the Alps. The observations of the Rhone glacier from August 1886 to August 1887 showed a decrease of thickness on all the lines, varying from 22 inches to 16 feet. The irregularity in the advance and retreat of the various glaciers is curious. Of two adjoining glaciers one may be advancing and the other retreating. Last year forty glaciers were reported to be advancing, but this year two of these have begun to retreat, whilst three others have begun to advance. The Glacier des Bossons is expected next year to begin a period of retreat.

Herr Meyer von Knonau contributes an interesting notice of a bishop of Brixen in the fifteenth century. Want of space, however, forbids more than a mere mention of it, and, besides, it carries us too far away from our subject.

Dr. E. von Fellenberg gives us a supplement to his 'Kritisches Verzeichniss der Gesammtliteratur über die Berner Alpen,'* which contains nearly forty works, varying in date from 1740 to 1887. Amongst these are six English books, the contents of which are noticed at some length. The work is a valuable addition to Alpine bibliography. A notice of the minerals of the 'Excursions-Gebiet' is supplied by Herr R. Ritz and Dr. E. von Fellenberg.

At the annual meeting at Bienne in August 1887, the question of mountaineering without guides was warmly discussed. It was finally agreed that any direct action of the Club in the matter would lead to no good result, if it did not aggravate the evil.

Dr. Ludwig Darmstädter, in his 'Tour in the Dolomites,' complains that many mountaineers (especially young ones) make ascents from the mere spirit of outdoing previous performances, and that the notes they leave on the summit, such as 'rope not used,' 'without guides,' &c., engender a spirit of false rivalry, which has already caused, and will cause in the future, serious disasters.

The special district for 1888 and 1889 is the group of the Graue Hörner, on the borders of St. Gallen and Graubünden, included in sheets 267–270 and 402 of the Siegfried Atlas. Besides a map of this district, there are in a case attached to the volume panoramas from the Rossberg, the Chaumont, &c.

In the volume itself are well-executed photographs of the Verstanklahorn and the Gross Litzner, and two views of the Märjelen See, illustrating the outbreak in September 1887.

During the year 1887 the S. A. C. have lost by death two eminent members, Dr. Iwan von Tschudi and the veteran Professor Bernard Studer.

At the end of the year 1887 the number of members was 2,831, and the balance to the credit of the S. A. C. was 26,307 francs. J. S.

* See *Alpine Journal*, vol. xiii. p. 194.

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Der Gletschermann. Herausgegeben von Gottfried Strasser. Jahrgang 1888. (Bern. Twenty numbers, 80 pages folio. 1 fr. 50 cent.)

Under this title Herr Strasser, the well-known pastor of Grindelwald (elected in 1879 and re-elected since), has started a periodical which may be roughly described as a sort of parish magazine for the valley of which he has the spiritual charge. The whole of its contents are of course strictly local, but many articles deserve the attention of all interested in 'das liebe Gletscherthal' as the editor calls it. Herr Strasser has written and published many pieces of verse; and many others—all good, and some with a considerable swing, and in the Grindelwald dialect—appear in these pages. He is also known to students as an excellent historian, and it is in this respect that the 'Gletschermann' is specially interesting to the outside world. Thus, we have a most interesting account of the regulations for the seven 'alps,' or pasture communes in the valley, accompanied by the text of those in force since 1883, a most valuable and important document for anyone who wishes to study the subject of alpine pasture lands. Another paper gives the true account of the wonderful escape of Christian Bohren after his fall into a crevasse on the upper glacier on July 7, 1787. There is a very curious list of the pestilences which in the sixteenth and seventeenth centuries devastated the valley, and the narrative of the late Emperor William's visit to Grindelwald in 1814. We find, too, a very important discussion as to the derivation of the name 'Grindelwald,' a sketch of Mendelssohn's visit to Itramen in 1831, an earnest exhortation against the practice of begging, once so common in the Oberland, a description of a week spent on an 'alp,' and of a lawsuit of the men of Grindelwald in 1657 with the Bernese governor in Interlaken. Several of these papers are further illustrated by additional notes sent in by readers of the 'Gletschermann,' and there are a few extracts from old books of travel. There are tables of births and deaths in the valley from 1876 to the end of 1887; the former amount to 1,347, the latter to 833. The latest number gives the result of the census taken on December 1 last, from which it appears that there were 518 dwelling-houses in the valley, inhabited by 3,094 persons (the women numbering thirty-two fewer than the men), 1,244 of whom were children. Herr Strasser adds the number of the population in earlier days, and gives a very curious table showing how many persons in the valley now bear the same family name. The Bohrens head the list with 262, then come the Baumanns (221), the Kaufmanns (207), the Jossis (189), the Roths (187), and the Inäbnits (178). There are 91 Rubis, 85 Bosses, 51 Michels, 26 Almers, and 8 Strassers. The two oldest inhabitants were born in 1804, and there is but one Roman Catholic and one person of no religion. Reminiscences of former Pfarrers, numerous riddles and humorous sayings and stories, a delightful encomium on Grindelwald butter from a Bernese lady in 1531, and an estimate of the annual amount spent by the Grindelwalders in their favourite occupation of smoking (no less than 22,734 francs!) are specimens of the lighter contents of the 'Gletschermann.' The headpiece to each number represents the well-known group of the church and pastor's house, backed by the Wetterhorn.

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We understand that this little paper has had a great success in the valley, and will be continued this year. Foreign friends of Grindelwald might do much worse than forward the modest subscription (not forgetting the extra postage) to the Pfarrer. This will help and encourage him in his most praiseworthy undertaking, and will be of good to the valley, for the profits of the paper, if any, are to be devoted to local objects.

Beiträge zur Natur-Chronik der Schweiz, insbesondere der Rhätischen Alpen. Von Chr. G. Brügger. Part vi. (Chur.: Hitz & Hail, 1888. 2*s*.)

Since 1877 Professor Brügger has been publishing, in detached parts (each, we regret to say, with a distinct paging), a very valuable list, in chronological order, of all the data he can gather together on the character of the seasons of each year since 1043, giving special prominence to the great natural catastrophies (such as storms, avalanches, landslips, plagues, famines, earthquakes, fires, floods, &c.) which have occurred. He limits himself to Switzerland, and in particular to the Grisons. The indication of each fact is carefully accompanied by a reference to the authority (an old chronicle or document) which has supplied it. The earlier entries are very naturally not continuous, but the chronicle is complete (or very nearly so) from 1560 onwards. In part vi. the author describes the seasons of the years 1751 to 1800, and doubtless the list will be continued down to our own days. It is difficult to over-estimate both the scientific and historical interest of such a record, while the vast trouble and research involved in ascertaining and sorting out these facts from all sorts of obscure authorities must have been very great. Professor Brügger has written much on botanical and historical subjects, but his 'Natur-Chronik' seems likely to be the most permanent record of his industry and zeal. We need only add that each part appears as an appendix to the programme of the cantonal school, but can be obtained separately.

Wallis und Chamonix. Von F. O. Wolf. Vol. ii. (8 francs.)
Die Brünigbahn. Von J. Hardmeyer. (1 franc.)
Das Kurhaus Tarasp und seine Umgebungen. Von J. Pernisch. (1 franc.)
(Zürich: Orell Füssli & Co.)

These works are the latest numbers of the well-known series of 'Europäische Wanderbilder,' which is issued also in English and in French. We have noticed the first volume of Prof. Wolf's work before.* The second volume describes Sion, the Val d'Hérens, the Rawyl and Sanetsch Passes, the Col de Cheville, the Great S. Bernard, S. Maurice and the Val d'Illiez, the passes to Chamonix, besides a special number devoted to Chamonix itself. On the whole, the level of the first volume is maintained, though the numerous woodcuts do not show any improvement. A full and interesting description is given of the ancient city of Sion and of its cathedral church and castle, while the hospice on the S. Bernard is also minutely studied, though there is a certain rashness, at least at present, in assigning fixed

* *Alpine Journal*, vol. xiii. p 277.

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dates for the birth and death of Bernard of Menthon himself. The Chamonix section, however (which is not by Professor Wolf himself), is distinctly more sketchy, and far less satisfactory, than the other part, and it seems a pity that Chamonix was tacked on to a book devoted otherwise exclusively to the Valais. In particular, the two pages devoted to the Alpine history of the peaks and passes of the Mont Blanc range swarm with a vast number of errors of date and name, few entries of either kind being even approximately right. Here are some choice specimens. M. Charlet-Straton is credited with the first ascents of the highest points both of the Dru and of the Blaitière. We can, indeed, conjecture who is meant by 'Marmeret' (Charmoz), 'Grasham' and 'Cellot' (Gèant), 'Walkott' (Mont Mallet), 'Encles' (Rochefort), and 'Reilly und Adams' (Mont Dolent). 'Lecestiven' (Col des Hirondelles) looks very mysterious at first, till we recognise in it the name of a former President of the Alpine Club. But we must confess that part of the entry in the case of the Col du Tour has fairly beaten us. Can any part of our readers help us to identify both the travellers 'Herren Kiptatschapman und G. U. Qerad' who are said to have passed the Col on July 12, 1853? It need only be added that the paging of the two Valais volumes is continuous, and that for all visitors of the district who care about the past of the land and the present state of its inhabitants the book is almost indispensable for use on the spot, while at home it may be supplemented by reference to the larger works on which it is based. Herr Hardmeyer's description of the Brünig railway, opened to the public last June, is a fit pendant to those of the S. Gotthard and Brenner lines, which have already appeared in the same series. Dr. Pernisch gives us a careful account of the well-known health resort Tarasp, and of the walks around it.

The enterprising Zürich publishers deserve all credit for issuing such handy and well-printed local guide-books, of which about one hundred and fifty numbers (6*d.* apiece) have now appeared.

Bollettino del Club Alpino Italiano per l' anno 1887. Number 54. (Turin, 1888.)

The editors of the 'Bollettino' are really to be congratulated on the last number of that periodical, which contains a great number of interesting and valuable papers relating to different districts of the Italian Alps (with an occasional excursion beyond these limits), and nearly all describing actual ascents or explorations. The wealth of material displayed in this volume is sufficient to put an end to the reproach that the Alps are exhausted, at least as far as regards the Italian Alps.

The Signori Sella lead the way with a rather concise account of their winter traverse of Mont Blanc, from the upper hut on the Italian side to the Grands Mulets, in a long day of twenty-two and a half hours (January 5, 1888). Bad weather, or rather a gale of wind, had defeated a previous attempt in February 1887, when the party had gained a height of 4,400 mètres (Mont Blanc being 4,810), and on their second trial they had to spend three days in the hut. Their perseverance was rewarded in the end, however, though the ascent was made in rather unfavourable weather, and the rocks were found thickly covered with

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snow. The party consisted of four travellers, the three Maquignaz, Emile Rey, and two porters. We note that on the Bosses steps of the summer before were found, though filled with ice. Signor Vaccarone completes his exhaustive and epoch-making monograph on the very intricate ranges at the head of the Val Grande, one of the valleys of Lanzo. In number 52 he had already described the frontier ridge between the Levanna and the Col de Sea. He now takes in hand the N. and S. boundary ridges of the Sea glen. The article is mainly taken up with the great peak of the Ciamarella itself (one of the highest of the Western Graians), and with a lower summit known as the Punta Bonneval, which has given many people much trouble from a topographical point of view. The present writer can bear witness from his own experience in the group that Signor Vaccarone's statements are throughout distinguished by the most admirable accuracy, and by the greatest clearness possible in treating of such complicated questions. The Alpine history of the district is worked out in a masterly fashion, and three excellent illustrations (one of considerable size) enable the careful reader to follow every line of the paper.

Signor Guido Rey contributes two papers. In the first he narrates his adventures and those of Signor Alessandro Sella, with G. G. Maquignaz and Antonio Castagneri as guides, on the Meije (night spent near the lower end of the Glacier Carré), the Ecrins (night spent on the summit itself!), and the Viso by the ordinary route from the South. The moonlight effects during the night on the Ecrins must have been very fine, though probably the adventurers would have preferred to witness them from a more sheltered spot. Signor Rey is rather inclined to exaggerate the difficulties of the Ecrins by the new route from the South, probably because his party did not hit on the right way up the rocks above the Col des Avalanches. On the other hand, he underrates those of the Meije to a degree which is remarkable when we consider that his party, having left the Chatelleret hut at 5 A.M., only reached the summit at 5 P.M., and that next morning they took six hours from their bivouac back to the hut. These times compare very unfavourably with those of Miss Richardson given in our last number (page 163), and we trust that Signor Rey will reconsider and withdraw what we cannot but think his ill-advised recommendation, that two experienced amateurs really require but a single guide on this ascent, though one bad climber ought to take two good guides. The article is illustrated by a fine reproduction of M. Jollivet's magnificent photograph of the Meije from the Etançons valley. Signor Rey's other paper describes a very important new route he has discovered (August 15, 1887) up the Viso, by the eastern face and arête. It seems far less difficult and dangerous than Mr Coolidge's route by the N.E. face (made in 1881: here misprinted 1887), from which it is entirely distinct, the two lines of ascent being marked on a large engraving of the peak given with the paper. Signor Rey alone with Castagneri took only 8½ hours (including halts) from their bivouac near the Lago di Costa Grande to the summit, and we learn from the 'Rivista Mensile' (1888, page 308) that on August 12, 1888, Signori Gay and Tourn with

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Castagneri accomplished the ascent from the neighbouring Lago Grande di Viso in 5½ hours, including halts, the route now being known. Signor Rey does not claim more for his route than that it is a pleasing variation on the usual monotonous and roundabout way up from the South; but we think he is fairly entitled to the honour of having discovered a direct route which would seem not to be dangerous at all, and not particularly difficult, despite appearances from below. These two papers will do much to confirm Signor Rey's position as one of the most enterprising and successful climbers that the C.A.I. numbers amongst its members.

The other papers in the new 'Bollettino' must be dismissed more shortly, owing solely to want of space. Signor Brentari sends a careful and elaborate paper on Dante as an 'alpinista,' citing many passages from the 'Divina Commedia' which are generally overlooked, and adding a very curious and interesting appendix (based on an article by Signor Appollonio) on Alpine terms generally, which are passing from the dialects into classical Italian, and particularly on those used by Dante. Signor G. Marinelli's monograph on the Carnic Alps could only be sufficiently noticed by a specialist like himself. It fills eighty-two pages (nearly one third of the 'Bollettino'), and seems to be absolutely exhaustive of the subject from every conceivable point of view, a useful diagram and a summary at the end giving the main conclusions of the author. Signor Abbate writes on the 'Tre Cime di Lavaredo,' commonly known as the 'Drei Zinnen,' in the Dolomites, describing the ascent of the highest summit (the central peak), and collecting many scattered notices of the ascents of all three. Signor Spezia's mind is distracted by the assumption of certain geographers that the Swiss glacier of Gries is the real source of the river Tosa. He vehemently disputes this claim, holding that the volume of water coming from the Italian glacier of Hohsand is far greater. The question is illustrated by an interesting diagram, but the author somewhat lamely, though reluctantly, concludes with the most recent Italian map-makers that the combined streams should bear the name of Tosa only after they form the famous cascade of that name at the head of the Val Formazza. Signor Abbate describes a new ascent—that of the Corno Piccolo—in the district of the Gran Sasso d' Italia, and Signor d'Anna another—Cima di Fiocobon—in the group of the Pala di San Martino. Signor Mattirolo sends some botanical notes on the flora of the Viso *massif*. Finally we have three more general articles, which we must be content with merely mentioning—those of Signor De-Marchi on the influence of mountain chains on the circulation of air, of Signor Zanotti-Bianco on the means of foretelling the weather, and of Signor Miliani on 'Alpinismo' in general. Besides the views already mentioned there are three excellent ones—two of the Corno Piccolo, and one of the Drei Zinnen.

This well-filled and most interesting volume is, however, but one sign of the great activity and vigour of the Italian Alpine Club, which on December 15, 1888, included thirty-four existing sections, an increase of four on 1887, numbering 4,517 members, an increase of nearly 500. It has done good work in the past, and there is every probability that it will do even more in the future.

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Guida al Gran Sasso d' Italia. Da E. Abbate. (Roma, 1888. Pp. vii., 222. 16mo. 5 francs.)

The scenery of the Abruzzi is chiefly known to English readers through the beautifully illustrated work of the late Mr. E. Lear. By English travellers the region has been neglected, partly from difficulties of access, now removed by the two railways from Terni to Aquila and from Rome to Solmona, partly from a fear of brigands, which has survived the reality. The provinces contain several groups worthy of the notice of lovers of mountain scenery. Foremost among these is the group of the Gran Sasso d' Italia, the subject of the present volume. The highest peak of this *massif*, known as the Monte Corno (9,584 feet), is the highest summit of Continental Italy south of the Alps. It is conspicuous from the east coast railway, rising in a steep double-headed rock peak, the snows on which flash brightly through the olive and oak woods of the lower hills. It is not till after midsummer that the mountain loses its silver crown.

It is, however, from the inland, or Aquila, side that the mountain is most often visited. The Italian Alpine Club has facilitated the excursion by building a hut at a height of 7,220 feet. The best help they have given the visitors is, however, by the publication of the present volume, which contains all necessary information as to routes, guides, and inns. The volume is well illustrated by plans, maps, and photographs. The maps are excellent, but some of the photographic illustrations are far from successful.

It would be a service to a few wanderers (and might create more) if the Italian Alpine Club would produce a compact pedestrian's guide to the Apennines. Somewhat stern compression would be necessary, and a determination to give only such information as is not to be found in the ordinary tourist's 'guides.' D. W. F.

Annuaire du Club Alpin Français, 14ème Année, 1887. (Paris, 1888.)

We suppose that it is on the principle that it is as well to change favourites now and then that in the new 'Annuaire' the Pyrenees are honoured, apart from a list of heights observed by different members of the Club, with but a single article (and that apparently of no great importance), while in former years they have appeared to some to have taken up more than their due amount of space. The Mont Blanc range, however, is unusually well represented. Monsieur J. Vallot describes in detail the three days (July 27-30, 1887) which he spent on the summit of Mont Blanc—an unparalleled feat—his main conclusion being that the temperature of the body is not lower there than it is in the plains, and that therefore the 'mal de montagne' is not due to the lowering of the temperature, but, as M. Paul Bert maintains, to the imperfect oxygenation of the blood. In the next article Madame Vallot takes occasion, in giving a short notice of her ascent of Mont Blanc on August 12 with her husband (who made no less than five ascents of this peak in 1887), to present us with a list of all the ladies who have been up. The total is seventy-one, and several more names might, to our knowledge, be added. Of these seventy-one, thirty-eight were English and twenty-three French, three of the former and one of the latter having made

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the ascent twice. Monsieur E. A. Martel, whose articles appear in all languages, but generally deal with the Mont Blanc range and the Causses, sends a valuable and interesting monograph on the Alpine history and topography of the Aiguilles du Goûter and d'Argentière; while Monsieur Dunod describes his exciting descent from the higher to the lower peak of the Dru, which seems to have been only possible by a succession of gymnastics on the rope. Finally, Monsieur de Poncins narrates his experiences on the Aiguille du Pouce in the range of the Aiguilles Rouges, and on the Blaitière.

The articles relating to Dauphiné are numerous and important. At last we have some authentic account of the mysterious Capitaine Durand, who, in 1830, spent three days on the Pelvoux. Colonel Arvers gives us a brief sketch of his life, and reprints his original notes of his stay on the Pelvoux and of his ascents of the Grand Rubren and of the Grand Bérard in the Ubaye valley. A diagram of his stations in 1829 and 1830 is annexed to this paper, which, though very brief, is rightly given the first place in the 'Annuaire' by reason of its very great historical importance. There is nothing in the notes to show that the party went higher than the Pic de la Pyramide on the Pelvoux, though it seems incredible that during their three days' stay they should not have taken the short and easy walk which leads thence to the highest summit. M. Arvers also sends a very interesting and elaborate sketch of the life and works of Pierre de Bourcet (1700-1780), to whom we owe the first good map of Dauphiné (surveyed 1749-1755), a map which even now is of very great value, by reason of the numerous local names it preserves, and is, in Southern Dauphiné at least, far more accurate than the new Etat Major map. M. Maitre describes his traverse of the Pic d'Olan (up from Val Gaudemar and down to the Glacier des Sellettes), on which he climbed all the three peaks of the mountain. He found the descent far easier than the ascent, and has no hesitation in pronouncing the northern summit to be the highest by from 5 to 10 mètres. This is, we believe, the second time only that all three points have been climbed by the same party. M. Favrichon, this time under his own name, sends to the 'C. A. F. Annuaire' what is practically the same article which we describe below in the 'S. T. D. Annuaire,' though in some points the former version is the more detailed. The indefatigable M. Puiseux has succeeded in finding several expeditions in the Tarentaise, either wholly or partially new, of which the most interesting is the descent from near the Dôme de la Sache on the Mont Pourri to the great Glacier de la Gurre on its E. flank; and the ascent of the Grande Casse by the North face from the Col de la Grande Casse. The personal experiences of the present writer on the Northern arête of the Pourri do not agree in all points with those of M. Puiseux. M. Tournier gives a lengthy description of the valley of Freissinières and of the French Waldensians, which savours much of the usual exaggeration seemingly ingrained in Protestant writers on Waldensian subjects, and has disappointed us so far as it deals with the curious and barren scenery of the valley. An article by M. Gouget on an attempt to reach the Col du Crachet between the Durance and Ubaye valleys is enlivened by some sketches by M. Emile Guigues in his characteristic style.

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Switzerland is represented only by M. Maitre's accounts of the Matterhorn, and of the ascent of the Piz Bernina by way of the Bernina Scharte (which he says presents no exceptional difficulties), and by some notes sent by M. Bioche, describing the first ascent of a point in the Vélan ridge called Aiguille du Vélan (3,649 mètres).

Among the other articles are the adventures of a 'caravane scolaire' in Dalmatia, Montenegro, Bosnia, and the Herzegovina, a descent of the Cataracts of the Nile, and a journey across Madeira. M. Daubrée (of the Institut) writes on the means recently adopted for preserving erratic blocks; M. Vézian on Elie de Beaumont and systematic orography, and M. Bénardeau on the important question of replanting hillsides which have lost the trees formerly covering them, dealing rather with the means of achieving this object than with descriptions of the damage previously suffered by any district, such as those of the Hautes and Basses Alpes. M. Raffy sends an amusing little article on the ascent of the highest point in Normandy, which is the forest of Ecouves, and rises to a height of 1,368 feet. Finally, M. Paul Zeiller contributes an interesting notice of his namesake Martin Zeiller (1589–1661), who for thirty years wrote the letterpress for Merian's great series of topographical works, one of the earliest of which was the 'Topographia Helvetiæ' (1642).

As usual, the 'Annuaire' is plentifully illustrated, and another sheet of the great map of the Pyrenees is given, this last instalment taking in both the Vignemale and Mont Perdu groups.

The report of the proceedings and activity of the Club during 1887 shows great progress in all departments. On June 1, 1888, it numbered 5,497 members, and in 1888 it distinguished itself by holding two fêtes, one in April at Nice, and another in August at S. Etienne, a fact which in itself shows that it is still young and vigorous.

Sixième Bulletin de la Section Lyonnaise du Club Alpin Français,
(Lyons: Mougin-Rusand, 1888.)

The Lyons section of the C. A. F. ranks as the second in point of numbers, and is probably the first so far as regards the energy of its members in climbing and in describing what they have seen during their climbs. Every two years or so it has the laudable habit of issuing in a thin volume the principal papers which have been read before it during that period. The present is the sixth of the series, and does not yield to its predecessors in point of interest. Naturally most of the expeditions made by the 'Lyonnais' are in the Dauphiné Alps, which lie, as it were, at their doors. M. Rodet describes once more an ascent of the Southern Aiguille d'Arves, his narrative seeming to show that this peak is an exception to the general rule, for its conquest does not seem to become less easy or less thrilling. M. Benoist briefly tells of his passage in the Brèche Giraud-Lézin, which in 1887 seems to have become quite a common expedition, though a difficult and roundabout one. M. Gabet gives some useful itineraries of the Col de la Temple, Col du Géant, and Mont Blanc. M. Sanlaville takes us to the Waldensian valleys, and his paper may succeed in attracting attention to the Alpine interest of this district, in which the passes and peaks are easily attained, but

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command wonderful views of the Viso and the Piedmontese plains. The 'Lyonnais' are not content with staying in the French Alps, for M. Bonnet tells us how he went in seventeen hours from the Concordia hut to Grimsel by way of the Finsteraarhorn, the Rothhorn Sattel, and the Oberaarjoch; while M. Berger writes on his exciting traverse from Italy to Switzerland over the Piz Bernina, an expedition made very difficult, and even dangerous, by a great storm which overtook the party close to the summit. M. Rodet gives us his experiences of his visit to the Carpathians, and M. l'Abbé Bauron describes his pilgrimage through Samaria. The only other paper is a lively one by M. Chappet on the Echelles de Bournettes, near the Lake of Annecy, which seem to be of the nature of the well-known ladders of Albinen near Leukerbad. A list of members, and various paragraphs—all of a satisfactory nature—as to the finances, numbers, and library of the Club, complete a modest and unpretending volume, which contains the record of some genuine Alpine work done, and proves that a vast amount of enthusiasm for the beauties of nature exists in the case of some at least of the inhabitants of the great and thriving city of Lyons.

Annuaire de la Société des Touristes du Dauphiné, 13ème Année, 1887. (Grenoble: Allier, 1888.)

For many years La Bérarde has been known as perhaps the finest mountaineering centre in the Alps, yet as ill provided in the matter of accommodation as it was well provided with peaks and glaciers. The S. T. D. in 1876 greatly improved matters by placing several beds in two little rooms constructed in Rodier's inn, and in 1887, after many strenuous exertions, and amidst many difficulties, it crowned its work for travellers by opening the Chalet Hôtel, under the management of M. Tairraz, of the Montenvers Hôtel. Hence the account of the fête given by the S. T. D. on July 10, 1887, to inaugurate the little inn, fitly opens the new 'Annuaire.' It seems to have been a very pleasant and joyous festivity, while the largely increased number of visitors to the village, and of expeditions made thence, show that the S. T. D. has supplied a real want. Had it not been for the very unfavourable weather of the summer of 1888 both numbers would have still further advanced, for, despite the elements, there were more English and foreign visitors than the place has ever seen before. La Bérarde has now taken the position in the eyes of the Alpine world which is its due; and for this we are indebted to the energy of the S. T. D., as well as to the indefatigable endeavours of the courteous and willing manager of the inn. Among the papers, by far the most important is that by M. Paul Moisson on the Chaillol range; it sums up past explorations in that region, and attempts to solve certain doubtful questions connected therewith We say attempts, for while we agree heartily with M. Moisson in almost all his statements (excepting certain questions of nomenclature), our personal experience on ascents of each of the five peaks of this range assures us that on the main question (the real height of the peak in the position marked by the absurd figures 3,211 on the French Ordnance Map) he is certainly in error. This peak, the exact topography of which M. Moisson was the first to clear

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up, is really the lowest of the five points on the Chaillol ridge, and not the third, as he tries to prove. A rough but very useful map accompanies this most valuable paper. Mr. Frederick Gardiner describes his eighth visit to Dauphiné, in which he mainly explored the ranges in Southern Dauphiné, a region which he has done so much to open up; he also visited La Bérarde (when he was one of the first party ever received in the new inn) and Monestier. Lovers of adventure may find some exciting episodes briefly narrated on the occasion of the first ascent of the Pic des Près les Fonds. Another paper describes in detail two days' climbing in the Grandes Rousses, including the first traverse of the entire ridge between the two highest summits, already mentioned in these pages ('Alpine Journal,' xiii. 403). M. Ferrand, the editor of the 'Annuaire,' contributes two articles. One unfolds the tale of his wanderings on and around the Pic du Clapier du Peyron—a lucky little peak, for it has only been ascended twice, and yet rejoices in three routes up it, all by entirely different arêtes and faces. The other is concerned with the technical details of recent advances in photography, an art in which M. Ferrand is an accomplished adept. 'F.,' whom any careful reader of the 'Annuaire' can, if he pleases, easily identify, narrates his experiences on the exciting ascent of that steep face of rotten rocks which leads up to the Brèche Giraud-Lézin, and on the Pelvoux, besides the crossing of several passes, the article being written with a most delightful freshness and enthusiasm. Science is represented by M. Ernest Chabrand's careful and elaborate paper on the glacial era in the Dauphiné Alps. The number of members of the S. T. D. (including the Paris section) on March 1, 1888, was 632, and it has doubtless increased since then. The accounts show a favourable balance. The S. T. D. is one of the most active local Alpine societies in existence, and has done much to open up the district, though it can scarcely hope in the future to excel its great work—the Chalet Hôtel at La Bérarde, with which we hope more even of our members than last year will become acquainted next summer.

Maps &c.

Those who have had occasion to use the marvellous Siegfried map of Switzerland know that, for mountaineering purposes, the sheets are sometimes divided most inconveniently, and that the only way out of the difficulty hitherto has been to have the sheets specially cut, joined, and mounted. The Federal Topographical Bureau has now conferred a great service on travellers by issuing bits of several sheets printed as one, in order to take in the whole of a special district. We have before us three sheets printed in this fashion:—'Thun-Interlaken' (taking in the whole of the lake of Thun and the ranges immediately around it), 'Berner Oberland I.' (the entire lake of Brienz and neighbourhood), and 'Berner Oberland II.' This last is specially important for mountaineers, as it is made up of bits of six sheets, and includes, in a very handy fashion, all the ranges around Grindelwald as far south as the Jungfrau and Finsteraarhorn. It will probably be popularly known as the Grindelwald sheet. Each sheet is strongly mounted on grey linen, with pasteboard sides, and is priced at 3 francs 30 cents.

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Monsieur Müllhaupt's 'Carte Relief de la Suisse Occidentale, Savoie et des Pays limitrophes de la France et de l'Italie' (scale $\frac{1}{300000}$), published by the designer at Bern, is apparently meant to bring out, by strong contrasts of shading, the main valleys of the region it depicts, which stretches from Geneva to the Simplon, and from Fribourg to Tignes. It is not unsuccessful in this, but in all other points of topography beyond the Swiss frontier it is very deficient, giving wrong heights, and choosing names in a most haphazard fashion. Its main interest is the tracing it gives of projected Alpine railways. Of course, the Lauterbrunnen-Grindelwald-Interlaken, the Geneva-Chamonix-Samoens, and the Courmayeur-Aosta lines appear. There appear, however, to be other lines in contemplation, e.g. over the Col Ferrex, and the Great St. Bernard, from Thun to Bulle and Montreux by the Simmenthal, and from Annecy to Albertville, and thence to Moutiers Tarentaise. Railways are indeed convenient, but in some places one does not want them, and the cry soon will be not that there are too few, but too many of these iron roads in the Alps, whither men resort for quiet. Railways leading to, or across the Alps are one thing; railways in the Alps quite another.

Herr Albert Heim has issued a big panorama from the Pizzo Centrale (3,002 mètres = 9,850 feet) near the S. Gotthard (Zürich, Cæsar Schmidt, four francs). The view seems to be most extensive, and the panorama carefully drawn in black and white, with a very full list of the peaks seen. It will, at any rate, fulfil admirably one object of panoramas, for it will show the discontented tourist in the midst of clouds or rain what he might see if it was fine, and may therefore entice him to repeat the ascent.

PROCEEDINGS OF THE ALPINE CLUB.

The Annual General Meeting was held at the Club Rooms on Tuesday, December 18, 1888, at 8.30 P.M. Mr. C. T. Dent, *President*, occupied the chair.

Messrs. J. G. Cockin, F. M. Davies, G. H. Makins, A. F. Mummery, E. De Q. Quincey, M. Schintz, and H. Woolley, were balloted for, and elected members of the Club.

On the motion of Mr. C. E. Mathews, seconded by Mr. H. Walker, the President, Mr. C. T. Dent, being eligible for re-election, was re-elected *nem. con.*

On the motion of Mr. F. C. Grove, seconded by Mr. F. Gardiner, the Vice-Presidents, Messrs. M. Holzmann and C. Pilkington, and the following members of the Committee, viz. Messrs. L. Pilkington, G. S. Barnes, W. M. Conway, H. S. King, and R. M. Beachcroft, being eligible, were re-elected *nem. con.*

On the motion of Mr. F. F. Tuckett, seconded by the Rev. H. B. George, Mr. Felix O. Schuster was elected Honorary Secretary *nem. con.*

On the motion of Mr. W. E. Hall, seconded by Mr. R. C. Nichols, Messrs. A. Mortimer, W. Cecil Slingsby, and H. G. Willink were

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elected *nem. con.* members of the Committee, in the places of Messrs. R. GASKELL and F. A. WALLROTH (who retired by rotation), and of Mr. F. O. SCHUSTER.

The CHAIRMAN then addressed the meeting as follows:

Of all the duties that fall to the occupant of this chair, none is more trying than the task of enumerating the losses the Club has sustained. On no occasion is the support of members more anxiously looked for or more needed. To-night we meet under circumstances so exceptional in our history, with the shadow of recent calamities so fresh in our memories, that some might almost feel as if the very vitality of the Club had been imperilled. It is surely at such a time that we should close up our ranks and stand shoulder to shoulder. Let me say at once, for the matter is, I know, in the minds of many, that it was this feeling that influenced the Committee in its decision to hold the annual winter dinner as usual, divesting it merely of the semi-public character which the social gathering at the afternoon picture exhibition involved. For the sentiments of those who would have preferred the abandonment of the dinner, I have nothing but respect. Following precedent, the Committee took the course which you are aware of, and for which they accept full responsibility, feeling sure that in their action they would be supported by the general body of members. Let me turn from this subject and endeavour to fulfil a duty which is incumbent on me, doubly painful though it be at this our annual general meeting, when the most representative gathering of members assembles in this room. Usually we have the record of some brilliant success; this year all such matters are put in the background by the recollection of our losses. We have to deplore the removal by death of a distinguished man from the list of our Honorary members, Count Paul de St. Robert, an eminent physicist and a worthy representative of those who find in the mountains a boundless field for scientific work of the highest order. A name little known perhaps to the majority of our members is that of A. T. Malkin, yet the Club cannot but regret the loss of so veteran a mountaineer, and one so closely connected with its early history. An intimate friend of a former president, T. W. Hinchliff, Malkin first began mountaineering more than fifty years ago. He may almost be said to have discovered the Eggischhorn, while he contributed largely to make the attractions of Zermatt generally known.

I have always endeavoured since you did me the honour to call me to this chair to keep touch between the older members and those who have more recently joined us, between those who made the Club and those to whom we look to carry on its handed-down traditions. It seems strangely sad therefore to pass from one who mountaineered fifty years ago to a member who joined the Club but three years since. But though so young a member, Harry Fox was already widely known. He threw into mountaineering all the keenness and energy which were so characteristic of his nature, whatever the undertaking he had in hand. The pages of the 'Alpine Journal' bear fitting testimony to his excellence as a mountaineer. Never, I think, has this Club had to mourn the early loss of a member who promised more

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and who had already shown good fulfilment of promise. He hit off in the happiest way the mean between mountaineering with a purely scientific object and climbing in the simple pursuit of pleasure and health. Thus, while he had always the keenest enjoyment in mountaineering, he was able at the same time to utilise every opportunity, and—as this year—to do good and valuable work in the mountains, useful alike to geographical science and to future explorers. If Harry Fox is to be in any way a type of the mountaineer of the immediate future, we can only feel that a good type has developed, and the Club, while it can never recall his memory without some tinge of sad regret, may yet always remember one of her youngest sons with pride.

I may be allowed to leave in great measure to others the task of speaking on a subject the nature of which you anticipate—perhaps the fewest words are best when all words are in vain; I feel, indeed, as if I had no right to say anything about a loss which to everyone present, whether they had the privilege of claiming Donkin as a friend or not, still must be felt as a personal affliction. No words, indeed, can appeal to you so eloquently as that empty chair, so long and so worthily occupied by our late Honorary Secretary. The widespread sympathy aroused by the death of our friend—a sympathy which is not confined to this country alone—is, after all, the noblest tribute to his worth. This much I may gratefully acknowledge—whatever measure of success has been the lot of our Club during the past two years has been due chiefly to the devotion, the tact, and the self-sacrifice of our late Honorary Secretary. One matter only remains. All will agree that some memorial should exist in the Club of one who, as secretary, was cut off while still at his post. I think that in this case the most fitting form of memorial is not far to seek, and I venture to propose therefore—'That, as a memorial of the late Honorary Secretary of this Club, Mr. W. F. Donkin, a complete set of his Alpine photographs be purchased by the Club, to be kept in a suitable cabinet in the Club rooms.'

As to the search for our lost friends (among whom we must not omit to reckon the brave guides of the party) it would be premature to speak at present. What may we expect to discover? Little enough, perhaps. Evidence of the precise nature of the accident, possibly some scrap of writing, some last message; it matters not. A simple duty guides us in this matter, and must be discharged. That every facility will be afforded, that all that sympathetic aid and material assistance can do will be forthcoming, there can be no doubt. But the expedition will not be fruitless. Some trace of what we seek will, I believe, be found. And what if it be not, and the thread of uncertainty has to be drawn out finer and finer till it snaps at last? Why, at least, we shall have the assurance that our friends sleep in peace; though in a far-off country, yet in the midst of scenes they knew and loved; enshrined in the very heart of nature, where the giant forms of some of the grandest mountains in the world form fitting monuments of their resting-place.

Mr. F. F. TUCKETT observed that he would not mar by any imper-

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fect utterances of his own the weighty and touching remarks of the President in introducing his proposal; but in seconding it most cordially as peculiarly appropriate, he would like—having elsewhere been permitted to allude to his cousin Harry Fox—to take this opportunity of expressing his deep sense of the loss which he personally, in common with his fellow members, had sustained by the death of their late valued Honorary Secretary and beloved friend, Mr. Donkin. He would also wish to bear grateful testimony to the excellent judgment shown by the President and his advisers, amongst whom Mr. Freshfield must be especially named, in dealing with the various important, often anxious and pressing questions which have arisen since apprehension was first felt as to the fate of our friends—a course, moreover, which, by keeping the discussion unusually free from the conjectures and suggestions of the ill-informed, had spared much needless pain to those most nearly concerned. He was sure that all would unite in a feeling of deep gratitude to those in official positions, whether in Russia or at the Foreign Office, who had with such true and cordial sympathy and alacrity assisted in or facilitated the work of organising the search, as well as to our countryman Mr. Peacock, and in a special degree to Mr. C. Phillipps-Wolley, whose freely tendered aid had been most valuable and opportune. The President and the Committee had already in each case officially tendered the thanks of the Club, and their action in the matter would certainly meet with the hearty approval of those present, as well as of our members at large. In conclusion, Mr. Tuckett alluded to the sympathy felt for the President under the sore trial of having, for reasons of health, to return to this country, and added a warm expression of his thankfulness that what at the time was so keen a disappointment for Mr. Dent and his companions has probably been the means of sparing us a yet wider reaching sorrow than that which is now filling all our hearts.

Mr. C. E. Mathews desired, as the senior member of the Club present, to express his keen sympathy with the President—a feeling which would, no doubt, be shared by all the members of the Club—and to pay a just tribute to the memory of the late Honorary Secretary. Mr. Donkin was a many-sided man, equally accomplished in science and in art, and was a magnificent climber. Ever courteous and high-minded, he bore without abuse the name of gentleman.

Mr. Walker, in supporting the resolution, expressed the opinion that a portrait of Mr. Donkin, similar to that of Mr. Moore, would give pleasure to the members of the Club, and hoped that the Committee would see their way to getting one.

Referring to the death of Mr. Malkin, Mr. Walker said that Mr. Malkin was the first traveller who called attention to the Eggischhorn as a point of view, and was one of the earlier visitors to Zermatt. It might interest the members of the Club to learn that the sketch-book of one of Mr. Malkin's party was left behind at Mme. Lauber's, to form one of the first strangers' books used at Zermatt. That book is now in Mr. Seiler's possession. Mr. Malkin was also the author of several works, the best known, perhaps, of which is 'Historical Parallels.' Since the death of his great friend, Mr. Hinchliff, and owing to his

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increasing age, Mr. Malkin has been little seen at the Club, and was therefore little known to the majority of the members. Mr. Walker would therefore only say in regard to Mr. Malkin's character, that he was beloved by all who had the good fortune to know him.

Mr. GROVE, though feeling that he could add nothing to the eloquent and just tribute that had been paid to the memory of Mr. Donkin, was, nevertheless, desirous of saying a few words respecting the lamented Honorary Secretary of the Club, as he had for a time been closely associated with him in the management of the Club affairs, and should feel that he was wanting in gratitude for his invaluable aid if he was silent now. That he was an admirable Secretary, invariably genial and courteous, they all knew, but some who had not been his colleagues or intimate friends might not be aware how much strength of character and decision he combined with unvarying anxiety and regard for the opinions of others. Unlike some urbane men, who never seem able to take a view of their own, Mr. Donkin held very clear and decided views, and from these, once formed, it was no easy matter to move him. Perhaps, when his remarkable attainments were considered, it would be seen that it could hardly be otherwise. Only a man of real strength of character and energy could have acquired excellence in such widely different pursuits. It had been said of him that evening, with undeniable truth, that he was a many-sided man, and it might be added, with equal truth, that he differed from some accomplished men, as he not only did several things well, but did them superlatively well. Few, very few, could hope to approach or rival him in this respect, but, without vainglory, he might be claimed as a typical member of the Club. It had been truly said that, unlike some other great physical pursuits, mountain exploration did not lead to mental narrowness, but that some of the leading members of the Alpine Club were men who excelled in other things than mountaineering. No one could better exemplify this than their lamented friend—so brilliant and successful in all he undertook, and a singular instance, moreover, of that modest reticence which is sometimes, though, unhappily, not always, allied to great intellectual power.

Mr. DOUGLAS FRESHFIELD said that, little as had been left to be added by previous speakers, there were several reasons which made it impossible for him not to join in the tribute paid to the memory of our lost members. He was probably the earliest friend of Mr. Donkin present, for he had been in the same form with him and next but one in school-order to him in the upper division at Eton in 1860. He had been his proposer for the Alpine Club in 1879, and he was also the only person in the room who had seen the scenes in which the party had spent the last days—happy days, one was glad to hear from Mr. Fox's diary—of their lives. Their last camp might be pictured as a flowery plain at the foot of a moraine-cloaked glacier, behind which towers a keen snow-crest. At the head of this glacier as one mounts it rises the noble peak of Dychtau fenced in by avalanche-swept cliffs. The climbers' plan, when they started on August 29 or 30, was to cross the ridge E. of the peak, bivouac beyond the pass, and then try the peak from its S.E. glacier, at present nameless.

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Mr. Donkin was a nephew of a well-known Eton character, the Rev. Stephen Hawtrey, an Alpine enthusiast, who travelled year after year in the Alps, was a kind friend to many Chamonix guides, and once bought a huge model of Mont Blanc, from which the boys of St. Mark's School at Windsor are still instructed in physical geography. From him Donkin probably first heard of the Alps. It was with his uncle that Mr. Freshfield met him at the Little Scheideck in 1879. He had taken up the Alps and photography as occupations for a life which had suddenly lost its happiness. His climbing qualifications at that time were comparatively slight. Most of his mountaineering was done subsequently with the friends he so quickly made in the Club. Others might speak of it more in detail.

'My chief remembrance,' continued Mr. Freshfield, 'is a night of awful storm we two and François Dévouassoud spent in 1881 at the hut of the Aiguille du Goûter, the greater part of which I passed in a vain attempt to modify a temperature in which the water on the stove froze as soon as the fire went out by stuffing innumerable crannies with one number of the "Spectator," while Donkin with characteristic tranquillity slept beside his camera until it was time to shoulder it and force a retreat down the rocks to the Col de Voza.'

Donkin was not easy to know intimately. Nature had mixed in him the reserve, the patience, the love of precision, the hesitations of the scientific investigator, with the quick sensibilities of the artist. Common annoyances, trifling details, left little mark on his mind. He would take any amount of trouble in order to do a kindness or to give helpful information. He would be very apt to forget to answer a note or to satisfy a bore. He reproached himself; he would suddenly stop short, pass his hand quickly across his forehead, and exclaim at his own forgetfulness. His official work was, it is no secret, a burden to him; he undertook it entirely from a sense of duty and loyalty, as a sort of return for the happiness he had found in the mountains. In the Caucasus above all he was happy. Last year, while he (Mr. Freshfield) was away, Donkin had called at his house for news, exclaiming as he left, with an eagerness and vivacity rare in him, 'Next to being in that glorious country oneself, the best thing is to hear of some one else there.'

'The Caucasus, alas!' continued Mr. Freshfield, 'holds him now, with his young companion and their guides. The Club has lost one of its most distinguished members, a man of rare and varied accomplishments, a Secretary of unremitting zeal and energy. We, his friends, have lost the most lovable of our companions; but his memory and his example remain, and they should be valuable to us for the rest of our lives.'

Mr. W. Mathews called attention to the loss which the Club had sustained by the death of the Comte Paul de St. Robert, one of the most distinguished of its Honorary Members. It was in consequence of the first Italian ascent of Monte Viso, organised by him and described in the historical letter addressed by Signor Quintino Sella to Professor Gastaldi, that the Italian Alpine Club, which had recently celebrated its twenty-fifth anniversary, was first established in 1863.

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Mr. Mathews referred to St. Robert's great eminence as a scientific man, to the versatility of his genius, and to the numerous memoirs he had published on scientific questions connected with the Alps, and especially to those upon mountain hypsometry. His death had severed the earliest link which united the Italian with the English Alpine Club.

The Rev. H. B. GEORGE spoke of Mr. Donkin's connection with the Oxford Alpine Club, of the high esteem in which he was held there, and of the pleasure he always gave when, as he regularly did, he came down to the autumn meetings of that Club to tell about his exploits on the mountains, and to show his latest photographs.

The motion was then put and carried unanimously.

The CHAIRMAN remarked that the course he now proposed to take was one which he felt sure would meet with the approval of all the members present, although it was unprecedented in the history of the Club; a paper was actually in readiness, and could be read if desired, but he would move the adjournment of the meeting as a mark of respect to the memory of the late Honorary Secretary. The motion was seconded by Mr. Holzmann, and carried unanimously. The proceedings then terminated.

The Annual Winter Dinner took place at Willis's Rooms on the evening of Wednesday, December 19, and was attended by 102 members and their friends.

Errata in Last Number.

Page 150, line 10 from bottom, *dele.* '(the Austrian Consul at Genoa).'

„ 159 „ 19. The fourth ascent of the Piz Bernina by way of the Bernina Scharte was made on August 10, 1887, by Monsieur J. Maitre, with Alois Kuntner and Josef Pichler of Sulden. Starting from the Roseg Restaurant at 2.15 A.M., the party reached the Fuorcla Prievlusa from the west side at 7.20 A.M., and gained the summit of the Piz Bernina at 1.50 P.M., the descent being made by the usual route to Boval. No very serious difficulties were encountered, save a coating of ice on the rotten rocks of the ridge between the Pizzo Bianco and the Piz Bernina. *See* 'Annuaire du Club Alpin Français,' 1888. pp. 175–9.

„ 168, lines 16 and 17, *for* 'Cascade' *read* 'Selkirk.'

„ 172, line 15, *dele* '(on a scale of $\frac{1}{11000}$).'

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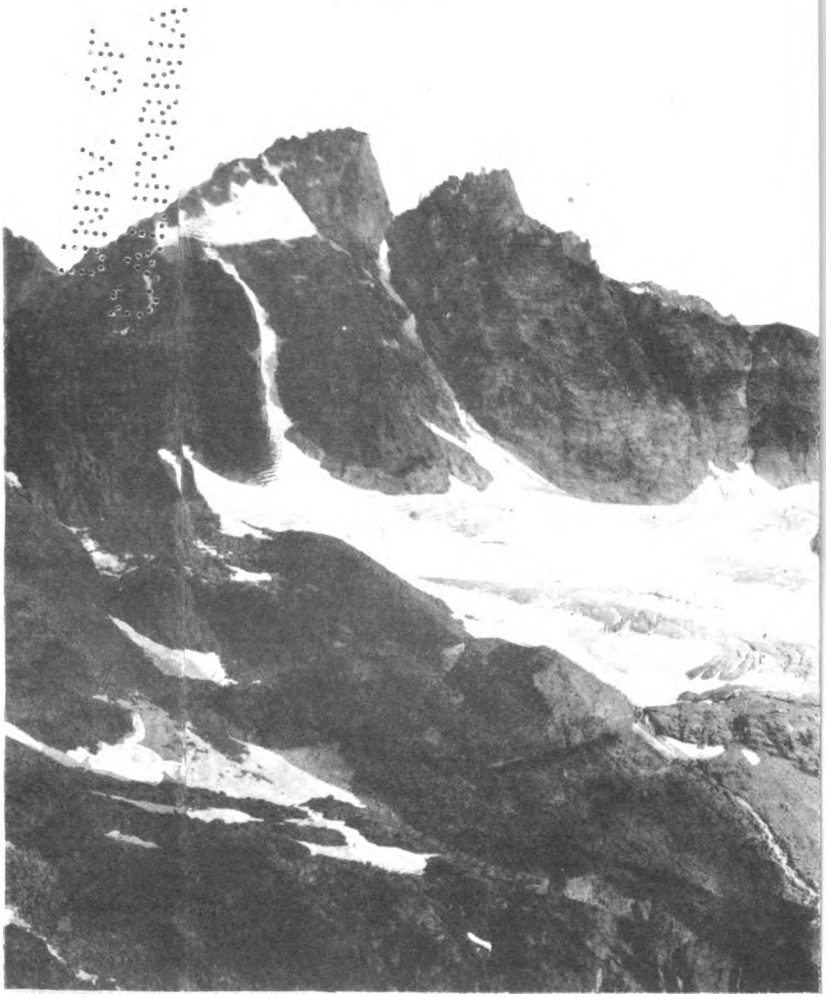
Colle Chamonin
(12,133 feet).

Punta della Luna, or
Punta di Ceresole
(12,343 feet).



From a Photograph by Vittorio Besso, of Biella

G. Noaschetta.

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THE

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Scrambles in the Eastern Graians.

By GEORGE YELD.

(Read before the Alpine Club, May 7, 1889.)

IV.

HAD not two years' absence from the Alps sharpened the longing to be once more among them, I think I should hardly have ventured out last summer. 'Snow and rain! Wind and snow!' Worse and worse grew the accounts I received. And when I reached the Lake of Geneva and saw the lower mountains clothed in white, I must own my spirits sank. However, I was now in for it, good or bad, so I lost no time, but hurried straight over the Great St. Bernard to find my friend Coolidge and the two Almers (Christian the younger and Rudolph) at the Hôtel du Mont Blanc at Aosta. Dark indeed was the tale they told. They had been caught in a 'tourmente' even on the Théodule, and had had a hard fight to get across.

Next day we went up to Cogne, and on the morrow started for a climb, only to be caught in a wild snowstorm at a very moderate height, and, after waiting for several hours under a dismal wet rock, to return disconsolate. On the following day Coolidge started for the Tersiva (11,697 feet), but was beaten while still well below the summit by a freezing wind of exceeding violence. But that north wind, 'cruel only to be kind,' was a benefactor beyond price. It continued to blow all night, and was the forerunner of eight days of the most perfect weather. On the morning of August 8, sure of our day, we started for the Punta Nera, a peak of 12,130 feet which rises on the ridge south of the Trajo Glacier, facing the Grivola. The climb was perfectly easy, and the view magnificent.

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The descent, the first part being very rapid, was made direct to the King's encampment (reached in 1 hr. 15 min. from the summit) on the Col de Lauzon route. A good deal of snow lay about, and made things easy for us. On the grass slopes near the path the alpine wallflower and *Eritrichium nanum* were very dwarf and brilliant. Indeed, this spot is one of the wild gardens of Cogne, if I may use the phrase. Others may be found in and above the Chavanis pastures,* and on the cliffs on the way to the Col de l'Herbetet,† while at a height of about 11,000 feet the Coupé de Monei‡ and Becca di Noaschetta may be mentioned for the number of little plants that blossom in the crannies of their rocks, with a bright and delicate colouring and a patient courage which endear them to the mountaineer.

On the 9th Coolidge enjoyed his revenge and a splendid panorama on the Tersiva, while I spent the morning in botanising, especially in searching for a certain *Epilobium*, which I had once seen near the end of the Grandcrou Glacier. By the riverside, between the point where the pineclad mountain-slopes close in to form the gorge of the Valnontey, and Crétaz, after a long hunt I came upon it. My plant found, I strolled up to Gimilian, much wondering that here and there

> All the place was peopled with sweet airs,

till I discovered the cause in some delicate white roses which throve in the bushes among the corn-plots. From the meadows above the hamlet I enjoyed one of those views which can be mentioned only, not described. The dark veil of the storm withdrawn had left the mountain world to liquid light and sunshine. Cogne with its meadows, forests, and crown of snow-peaks on one's left, and Mont Blanc and the Trélatête throned in an azure sky in front, still rise before me as I write.

The next day Coolidge and the Almers crossed the Herbetet Col to Val Savaranche, climbing the Mont Herbetet (12,396 feet) on the way by the northern ridge, and finding the rocks rather difficult towards the summit by reason of the great quantity of snow. In 1881 G. P. Baker and I, with Ulrich Almer to lead us, had climbed it by the eastern ridge—one of the best rock-climbs in the Cogne district.

Meantime, with Joseph Jantet and his brother, I crossed

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* *Alpine Journal*, vol. xii. p. 86.
† *Ibid.* vol. xi. p. 15. ‡ *Ibid.* p. 19.

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the Lauzon with the baggage, and did a little plant-hunting by the way. Just above the lower Luvione chalet we enjoyed a perfect view of the Herbetet's bold pyramid; sharp, massive, defiant, it almost deserved Coolidge's eulogy, 'the finest of the Cogne peaks.' Just below the chalet when we had crossed the stream to its true right bank, on a steep close to the water's edge, where edelweiss was very plentiful, I found in abundance a fine primula, which if not *Primula pedemontana* bears a strong resemblance to it. We continued on the right bank, and by a path rapidly increasing in steepness descended upon Tignet, which made a pretty picture as it shone in the sunlight, with its timbered houses stained a rich brown by years of storm, and pasture, river, and pine wood, like familiar friends. We did not, however, descend to Tignet, but bending to the right made a traverse across steep meadows, and, passing between some houses, found ourselves, to my surprise, before the door of the little inn at Dégioz.

Our first duty was to secure some toil-enduring beast to carry our baggage and provisions to the Rifugio on the morrow. After some negotiation Jantet made a bargain, satisfactory to both parties, with a man from Pont. Then, dinner ordered (travellers are recommended to call for 'none of your samples, but the whole outfit'), I wandered out to wait for Coolidge and watch the world of haymakers everywhere hard at work. The hay-scented air soon began to grow cool, as the sunshine climbed higher and higher up the forests and mountain-walls to the music of cowbell and torrent. By-and-by Coolidge and the Almers arrived, having had a glorious day on the Herbetet.

We slept in the big room that used to be the kitchen (St. Anthony, in brilliant fresco, adorns the outside), which has a window looking out on the main street, through which a persevering observer can see fairly into the chamber. The old cook furnished us with very good meals and was most anxious that we should want for nothing which the resources of the village could furnish. In fact, she was so anxious to please that I think the filling of my boots with chopped hay must have been intended as a gracious attention. If it did not delight me, it at any rate amused Coolidge, who laughed heartily at the stream that poured out of them. I am inclined to think that the earnest gaze of a passer-by, which Coolidge discovered directed upon him while dressing, was intended as compensation for the absence of hay in his boots.

In due time the next day, August 11, we reached the

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Rifugio (8,767 feet), and there established ourselves for four nights. I need not say more than that we found it exceedingly comfortable, and were duly grateful to the Italian Alpine Club. It was known amongst us as 'The Palace,' and we had it all to ourselves, as nobody came near us except a 'garde-chasse,' who has charge of the building, and our porter Jantet, who made a very thorough acquaintance with the track between 'The Palace' and Dégioz.

It was no small pleasure to see, as we did day by day, the awakening of the morning on the snow-peaks—but the evening colour effects were unspeakably beautiful. All the points of the various ridges would suddenly assert themselves with the most startling sharpness in an atmosphere of very pale gold, while the heaven was of a subtle pale pink, and the moon cold and clear. Nor was there wanting that band of green (or, shall I say, eau de Nil?) along the horizon which is the sure presage of fine weather. I venture to give one note from my pocket-book as a specimen:—'Evening about 7.30, most lovely golden clouds here and there. The moon very pale. The Charforon and Monciair pale gold and pink.'

Our great ambition was to climb the eastern side of the Grand Paradis by way of the col between it and the Cresta Gastaldi, and then to ascend the Cresta itself. Many times had I reproached myself for not having long ago tried the Cresta Gastaldi, for I felt certain of success, and I coveted the ascent of the Paradis by the route by which we eventually descended him more, perhaps, than any expedition in the Alps. The thought that this particular route was untouched dashed with bitterness even the delightful memories of 1879, when Alphonse Payot and I crossed the Paradis from the Valnontey to Ceresole. Every one who has a passion—as what mountaineer has not?—for a particular group in the Alps will, I know, sympathise with my feelings.

The morning of August 12 found us in high spirits, and much interested in the account of a dream which Rudolph, who is an enthusiastic chamois-hunter, had had, wherein he had chased a bouquetin, caught him, and ridden him home to Grindelwald! In 3 hrs. 17 mins. walking from 'The Palace' we reached the summit of the Grand Paradis. It was Coolidge's second and my third visit. After enjoying the splendid view we turned south-east from the summit with the cairn, and gained the top of a great couloir which is a very conspicuous feature in views of the Grand Paradis from the east. It is just north of the rocky aiguille at the angle where the Grand Paradis ridge and the Pointe de

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Ceresole (Pic de la Lune)—Becca di Moncorvé ridge—join each other, and its head is the next gap but one south-east of the peak with the cairn. And now came the fateful moment. Christian was let down the couloir to see what he could of the route. By-and-by he reappeared. Well? Coolidge looked at Christian, who nodded assent, and then turning to me said, 'It's all right.'

Then Rudolph took the lead, followed by me and Coolidge, while Christian had the place of honour as last man. The beginning of the descent, which was very steep, required care, as the rocks were deeply covered with snow. Above us to our left hung a great cornice like a monstrous bat with wings outspread, but we avoided any danger from it by making a sharp angle to the right. What a glorious sight as one looked back at the cornice! What a splendour of white and azure! At first we had moved one at a time, but before long we were able to descend at a good pace, and in an hour and twenty minutes from the top of the couloir we were on the col.

Here we found a bee stretched on the snow almost lifeless and little recking of the fame which awaited him. Coolidge carried him to 'The Palace,' where he revived in the sunshine. After this bee we named the col (12,638 feet*), not without a thought of the well-known Col des Hirondelles. Five minutes' sharp walking from the col took us to the top of the Cresta Gastaldi (12,671 feet), well content with our day and looking down in wonder on sunlit Cogne. Seen from the valley our mountain is a fair white crest, seen at evening from the Herbetet chalet—

> A moonbeam in the shadow of a cloud
> Is less heavenly fair.

It lives in my memory as one of the loveliest sights I ever looked upon.

An hour's keen enjoyment followed. The view was beautiful. From the spotless snow-plain of the Tribulation outspread at our feet we looked down upon Cogne's familiar fields; while the great peaks round linked one to another

* The heights assigned in this paper and on the accompanying illustration to the Col de l'Abeille (3,852 mètres), Cresta Gastaldi (3,862 mètres), Col Chamonin (3,698 mètres), and Col de la Lune (3,513 mètres) are taken from the map of the Grand Paradis group by Signor Pio Paganini, contained in his work 'La Fototopografia in Italia' (Rome, 1889), for a copy of which I am indebted to the author's courtesy.

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the happy summer holidays I had spent amongst them, and the Dauphiné giants in the distance forged for Coolidge a similar but far longer chain of memories. I don't think we forgot to drink to our new peak in a cup of Madeira which, if it had not made a voyage to the Indies, had, at any rate, travelled the long round from Cogne to Dégioz and 'The Palace.'

On our return to the col a brief conference ensued. Christian having pronounced the descent to the Noaschetta Glacier practicable so far as it was visible, and being very keen to try it—as, I need not say, we ourselves were—we started diagonally across the little hanging glacier which clings to this side of the Grand Paradis, and is so pronounced a feature in the view from the Tresenta. This little glacier, hitherto untouched, we would call Glacier de l'Abeille. The glacier crossed, we came to its ice-fall, but avoided all danger by keeping to its right, though we passed so close to its towering pinnacles and huge icicles that we had a glorious view of them against the sky. Then after a jump we made our way to the right over not difficult rocks, and came to a big couloir, into which we descended without much trouble, and then tramped down it as hard as we could and shot out merrily on to the Noaschetta Glacier in triumph. There we exchanged congratulations, and patted Christian on the back for a piece of guiding which for skill, foresight, and prudence places him in the very foremost rank amongst guides, while as for Rudolph, he had led down the great couloir, and brought up the rear during the descent from the Col de l'Abeille with perfect care and steadiness, which promise well for his future excellence as a leader. The view as we looked back from the spot where the glacier begins to slope to the Col du Grand Paradis was splendid. To the left (in looking back) of our route, huge rock towers—five bigger than the rest—frowned down upon us, and to the right the ice-fall of the Glacier de l'Abeille hung over what looked a savage impracticable wall. I thought of my description of this route in 1883, as seen from the Tresenta—'seems very risky, being commanded by crumbling rock-towers and *séracs*'—with a smile, for I believe that the route we took, as we found it, was perfectly safe. We then returned to 'The Palace' by the Col du Grand Paradis and Moncorvé Glacier. As we talked over our day's work in the evening Coolidge agreed with me that there was but one word to describe it—it was ideal. But I must add that we found the snow in the great couloir, and also on the Glacier de l'Abeille, in an exceptional state.

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It was simply perfect. In most years the great couloir is probably a sheet of ice.

The next day we retraced our steps to the Col du Grand Paradis, and traversed the whole length of the Noaschetta Glacier—a beautiful and extensive ice-field answering to the Plan on the north of the chain. It may be said to be divided into a west bay, as far as the Pic de la Lune or Pointe de Ceresole, and an east bay from that peak to the Tête de la Tribulation and Becca di Noaschetta. We then climbed the easy western ridge of the peak (up to that time without a name), marked 3,447 mètres (11,310 feet) on the new map, which we christened Becca di Noaschetta, and gained the top in three quarters of an hour from the glacier. These easy rocks were

Lit by the gems of many a starry flower.

I noticed especially *Eritrichium nanum*, *Petrocallis pyrenaica*, and *Ranunculus glacialis*.

The summit commands a sight of Cogne over the main ridge, and certainly *the finest view* of the Grand Paradis I know.

Thence in thirty minutes by a traverse above the Glacier du Grandcrou Sud and a snow-couloir we reached the col between the Tête de la Tribulation, and the point marked 3,543 mètres (11,625 feet) on the new map. In five minutes more we reached this point, which, from its position, we named Tête de Valnontey. In 1885, when we came up from La Bruna by the Glacier du Grandcrou Sud and this same couloir, we had been unable to see anything till the weather suddenly cleared on the top of the Tête de la Tribulation. The Tête de Valnontey is but the end of a ridge, 'tis true, but as a viewpoint it enjoys the distinction of looking straight down the whole length of the Valnontey. We saw to perfection the pines in the narrow gorge at the foot of the Grandcrou, the great green lawn of the Cogne meadows, with their protecting forests on either hand, and Cogne itself lapped in quiet sunshine. Beyond, the gold of the ripening corn glowed in undulating lines on the steep slopes, and Gimilian's picturesque and weather-worn chalets slumbered on the hillbrow—all seemed peace. Suddenly the thunder of an avalanche from the ice-fall of the Dzasset Glacier rolled up to us, and drew the eye to a perfect view of the huge Plan de la Tribulation. This is the only point from which the Grand Sertz makes a good show. Hence it appears a tremendous wall, with a snow-clad head.

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Then we crossed the col—Col de Valnontey (circa 11,596 feet)—and jumping a bergschrund descended towards the Plan de la Tribulation. Again, the snow was all that could be wished, and our route consequently easy, much to my surprise, for though I had hoped that it might be possible to ascend to the col from the Plan, never in my wildest flights did I think of descending. In fact this col was generally, in our discussions, looked upon by Coolidge as a joke; and I suspect that where we found good snow ice, in most seasons holds the field.

In 30 mins. we gained the col between the Tête de la Tribulation and Pic de la Lune, or Pointe de Ceresole, first reached from the north by Dr. Baretti August 31, 1874.* This col we named Col de la Lune, as a consecration of the memories of the beauty of this side of the Plan when seen by moonlight † in bivouacs at the Herbetet.

From the col (11,526 feet) Coolidge, with his chronic hunger for peaks still unsatisfied, and the two guides ascended the Pic de la Lune (up which I had been in 1879), while I basked in the sunshine and enjoyed the grateful silence unbroken save by the tinkling of water among the rocks. By-and-by the attractions of a most delicate and lovely snow ridge, which rose gently tapering to a sharp edge on the east of the col, proved too great to be resisted, so, finding the snow excellent, I went up it and looked down once more on Cogne.

On Coolidge's arrival, in high spirits, we turned to descend to the Noaschetta Glacier. On our way up the Becca di Noaschetta we had carefully examined the descent from our present position. We saw a grim wall of red rock furrowed with several couloirs, not inviting, indeed, but still 'food for fortune's tooth.' It is only fair to point out that we had this advantage over Dr. Baretti, who only saw the descent from the top of the col. Again Almer's skill was conspicuous. Over a streak of snow we descended to the right to rocks much easier in reality than they had looked from below, and presently clambered, with some care, into a snow couloir. Then we kept straight down, till before long a patch of ice drove us to the left-hand rocks. The ice circumvented, we again descended into the couloir and rushed, as fast as the now softened snow would let us, out on to the Noaschetta Glacier in 35 mins. from the col. And so another long-cherished scheme saw itself accomplished.

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* *Per Rupi*, p. 67. † *Boll. del C. A. I.* 10–11, p. 327, *note.*

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The scenery of this eastern bay of the glacier is fine, and the cirque of rock from the Pic de la Lune to the Becca di Noaschetta is imposing, as will be seen in the illustration which accompanies this paper.

Then off we tramped for 'The Palace,' casting a well-satisfied eye back at our day's work and making little of the soft snow. By-and-by, when we reached the centre of the western bay, by common consent we stood still for a good look at the Cresta Gastaldi and the Col de l'Abeille, and I think the whole party felt well contented. At last the south side of the Plan was well explored.* Then to the Col du Grand Paradis, and so to 'The Palace.'

On the 14th Coolidge, with the Almers, traversed the Tresenta and the Charforon, ascending the latter by a new route from the Col du Moncorvé, while I lounged about in the sun and mused upon the change 'The Palace' had effected. In 1883 I traversed the Tresenta, starting from and returning to Ceresole, and found it a very long day, whereas Coolidge only took 9½ hours (including all halts) to do the two peaks from the Rifugio and back.

The next day we retraced Coolidge's track to the Col de Monciair, having added Jantet to our party as a reward for the goodnatured and generally satisfactory way in which he had carried out his duties as porter. With imperturbable good humour he tramped up and down between 'The Palace' and Dégioz, not seldom heavily laden. I have praised his willingness before, and must in justice to him repraise it here. From the col in 35 mins. we ascended the Becca di Monciair—a very graceful peak, well seen from 'The Palace' —the only excitement being an arch just above a big red rock, which made us keep out a little to the right, or Val Savaranche, side. The great tooth so conspicuous in all views of the peak from the north, which we had looked forward to passing with some interest, is below the crest of the ridge.

The summit commands a fine view, but wildly driven light white clouds swept swiftly over us at intervals. In fact the weather gave us just

> The uncertain glory of an April day,
> Which now shows all the beauty of the sun,
> And by-and-by a cloud takes all away.

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* See *Alpine Journal*, vol. xiv. pp. 147–9, for details of the work of Dr. Baretti and others. It should have been clearly stated there that Dr. Baretti was the first to reach the Col de la Lune from the great snow-field of the Plan de la Tribulation.

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The Paradis in a whirling veil of mist was massive and splendid. Christian varied his route a little in descending by going straight down the slope immediately below the summit (as you look to the Col de Monciair). On the ascent we had kept to the Val d'Orco side. This slope is of the steepest, and in most years I suspect hard ice; but we felt little surprise at being able to walk straight down it after our previous experience of easy snow where ice must in most seasons be found.

We got down from the col to the Broglio Glacier without trouble, except at the one bad place which G. P. Baker and I, led by Christian's elder brother Ulrich, had found in 1881, where we had a little amusement. Here Jantet, who was last and carrying a heavy load, managed very creditably. The discovery of *Campanula barbata alba* in its old habitat, and of some late flowers of *Liliastrum* were the only incidents of the descent, till we reached by a short cut the meadow above the road to the Stabilimento, where I called upon Jantet for an overcoat wherewith to make a becoming entry into the Albergo della Levanna. The old Stabilimento was closed, and a very large building better suited to modern wants was well on the way to completion on the other side the road facing the Albergo.

Under the awning who should be seated but the Comte d'Aglie, who welcomed us warmly to Ceresole. We had afterwards the pleasure of meeting his father, to whose courteous kindness we are much indebted for the enjoyableness of our little stay at the Albergo. He was our guide to a charming spot in the great forest across the Orco where soaring pines, bubbling stream, moss, and ferns made a perfect sylvan hermitage, the restful coolness of which we greatly enjoyed. As for the views on our way back, they were more than lovely, they were loveliness. The shining river, the great waterfall veiled in sun-illumined spray, little plots of golden corn, gracious spaces of greenest herbage dotted with trees which gradually massed themselves into the serried ranks of the forest—all this was ours to rejoice in—

Under the roof of blue Italian weather.

In the background the proud peaks of the Levanna rose cold and stern.

On the morning of the 16th 'as the froward sky began to lower' we all started together up the Val d'Orco, and separated where the path for the Col du Carro leaves the main track, Coolidge and the Almers for Bonneval and Lanslebourg,

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Jantet and I for the Nivolet and Aosta. Both destinations, thanks to forced marches, were reached the same evening. So our party broke up, and with it the fine weather, that week of wondrous weather which had added so largely to our appreciation of Christian's exceptional skill and foresight, and of Rudolph's steady promise of future excellence, to our knowledge of the Eastern Graians, and not least to our happy memories of Italian Alps.

The Dolomites of San Martino di Castrozza.

By G. SCRIVEN.

(Read before the Alpine Club, March 5, 1889.)

WHILE the members of the Alpine Club have, for the last few years, become accustomed to listen to thrilling accounts of exploration and the conquest of magnificent peaks in the Andes, Himalayas, and Caucasus, and while the great mountaineering centres of Switzerland become each year more and more overcrowded, there remain, in out of the way corners of Europe, districts which have been almost neglected by English climbers. To one of these districts I wish to call your attention; and, although, like the knife-grinder, 'Story? God bless you! I have none to tell, sir,' at least of new ascents, I hope to show that most interesting scrambling and beautiful scenery of a very remarkable character may be found among the rocks and valleys of the South Tyrol.

The majority of English mountaineers seem to have the most vague ideas with respect to the mountains known as 'the Dolomites;' and many, I believe, if asked whether they were acquainted with them, might reply in the spirit of the globe-trotting cockney when asked if he knew the Dardanelles—'Awfully good chappies, I hear, but I didn't meet them.'

A reference to the back volumes of the 'Alpine Journal' will show how scanty are the descriptions in our annals of these wonderful peaks. But while English climbers have neglected them our Austrian and German brethren have been busy among the Dolomites, and during the last few years all their remarkable peaks have been conquered.

To many besides the climber, who, as Mr. Ruskin asserts, looks upon mountains only as 'greased poles to exercise on,' these peaks offer numerous points of interest. To the geo-

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logist they still afford many debatable questions; to the botanist their valleys and lower slopes display an almost bewildering variety of rare and beautiful flowers and ferns; and to the artist they present combinations of boldest precipice and most fantastic crags with luxuriant forest and sparkling waters.

The name 'Dolomite' has been bestowed on these mountains on account of their geological formation, which was first described by the Marquis de Dolomieu, a French geologist of the last century. The magnesian limestone of which they are composed occurs in other countries, but nowhere in Europe to such an extent or in such imposing masses as in the South Tyrol. It is true that, in addition to its strict signification, the name 'Dolomite' has acquired a loose and extended sense: from the fact of several mountains in this region consisting mainly of magnesian limestone, or 'Dolomite,' the entire region (including mountains exhibiting no such formation) comes to be spoken of as 'the Dolomites.' As to the origin of this form of limestone, there has been considerable dispute. The theory which has, I believe, met with most general acceptance is that of Richthofen. His view is that the original carbonate of lime, of which these rocks partly consist, was deposited as coral at the bottom of the ocean during the Triassic period; and that by the action of the water, assisted by pressure, and probably also by heat, carbonate of magnesia became combined with this carbonate of lime in various proportions, thus forming the magnesian carbonate of lime now known as 'Dolomite.' This process has been actually observed in operation in the island of Matea, north of Tahiti, and in other islands of the Pacific. Here specimens of coral rock have been found containing as much as 38 per cent. of carbonate of magnesia, the equivalent quantity of carbonate of lime having been displaced by the action of the sea. Not being a geologist, I cannot offer any opinion on the probability of this ingenious theory, and can only hope that some of our eminent geological members will give us the benefit of their views on the subject.

San Martino di Castrozza (4,910 feet), the Dolomites in whose immediate neighbourhood I shall endeavour to describe, lies almost due S.E. of Botzen, and is most conveniently reached by driving from Neumarkt, a small station on the line to Trent, 14½ miles from Botzen. The drive is a long one, occupying 14 or 15 hrs.; but a convenient halting-place will be found at Predazzo, more than halfway to San

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Martino. The 'Nave d' Oro' in this village is a comfortable, old-fashioned Italian inn, and contains records of the visits of many eminent geologists, among them Humboldt and Sir Roderick Murchison, portraits of whom, and of other illustrious visitors, executed in the signboard style of art, decorate the walls of the humble *salle à manger*. From Predazzo the road leads, by the hamlet of Paneveggio, over the Rolle pass, whence the first distinct view of the San Martino peaks is obtained. First, on the left, comes the Cima di Vezzana, the highest in the district, according to the most recent survey 10,466 feet. It is snow-covered, and by no means so striking a peak as its right-hand neighbour, the splendid Cimone della Pala (10,450 feet). Seen from this side the Pala well deserves its sobriquet, 'the Matterhorn of the Dolomites,' the precipitous knife-edge arête on its northern side reminding one of the great Eiger arête as seen from the Grindelwald valley. The dark mass of rock at the W. base of the Pala presents a striking contrast in colour and formation to the pale cliffs above; it is of a deep brownish crimson, and consists of porphyry, of which considerable tracts have been passed on the road, but which does not occur farther down the range. Following the ridge southwards, we next come to the Pala di San Martino, a round-topped but very precipitous peak, the ascent of which I hope presently to describe. Next comes the Cima di Rosetta; which, though from San Martino it presents a most formidable appearance, is in reality by far the most accessible of the group, being ascended by the easy snow-slope on its left. The Figlia di Rosetta is a smaller but much more difficult peak than its parent. Next comes the Cima di Ball, named after our countryman, whose guide-books have done so much to open up unfrequented districts. The first ascent of this peak was made by Mr. Leslie Stephen quite alone, and is described in his delightful 'Playground of Europe.' At the time of his ascent it was, like most of the 'peaks of Primiero,' nameless. Beyond the Cima di Ball stand the two wonderful obelisks of the Sass Maor, the most remarkable forms in the group; while in the distance lies the Vette di Feltre range, which bounds the south side of the Primiero valley and shuts in the view from San Martino in that direction.

Having thus taken a cursory glance at the San Martino Dolomites, as seen from the Rolle pass, we will proceed down the excellent zigzag road to San Martino itself. This can hardly be called a village, and indeed its precise definition would be a matter of some difficulty. It consists of

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the remains of an ancient monastery and hospice, now a second-rate hôtel, the house of the *padre*, and a modern hôtel of small dimensions but admirably managed by its obliging proprietor, Herr Panzer. All these buildings adjoin, forming two sides of a square. A chapel, a tiny *dépendance* to one of the hôtels, and a few very scattered chalets complete the settlement. Historically the hospice is of interest, having been founded by a bishop of Trent, to which see this district was granted in the eleventh century. The hospice is let to its present proprietors on condition that its ancient rights are preserved, and any traveller in search of insect-haunted, grimy lodgings can have them for the asking at the Hospice of San Martino.

Our first introduction to the valley was not encouraging. The drive from Paneveggio had been accomplished in heavy rain, which effectually shut out the view from the Rolle pass, and which increased to a deluge as we approached San Martino. Our first care, after taking possession of our rooms, was to enquire for Michele Bettega, the only guide in the valley, whose services we had engaged some weeks before. We were somewhat surprised to find that he was the polite person resembling a stage brigand who had carried our luggage into the hotel. His functions are, indeed, various, and most nearly resemble those of the so-called 'boy about the place' in an Irish establishment; for not alone is he the only competent local guide, but he fulfils the office of *Hausknecht* to the Hôtel des Dolomites, besides being ready to turn his hand to carpentry or masonry, while on Sunday he officiates as churchwarden in the little chapel above the hôtel. Our chief difficulty with him was his language, which is exclusively the Italian patois of the S. Tyrol, a survival of the ancient dialect of Venice, to which republic these valleys once belonged. However we managed to get along very well with him, West having a good reading knowledge of Italian; and as Mark Twain advises that when at a loss for a German word you simply 'heave in a "Schlag," and the chances are it fits the hole like a plug,' so, when doubtful as to an Italian word, if you can shove a Latin one into the crack you probably staunch the leak in your sentence. The essential words in a climbing vocabulary are fortunately very few, and when one has realised that 'avanti' means 'vorwärts,' 'aspetta' 'stop,' 'piano' 'carefully,' 'sicuro' 'fest,' and has learnt a few more climbing words, and some half-dozen relating to the commissariat department, one can travel with an Italian-speaking guide

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with perfect comfort as regards necessary conversation, though it is true one loses much by being unable to understand more general remarks.

For our first expedition we chose the Cima di Rosetta (8,975 feet), as being the easiest and shortest available Dolomite, both West and I being quite out of training. How easy it is, in spite of its formidable appearance on the west or San Martino side, may be understood from the fact that, my own boots being in the hands of the Primiero cobbler, I ascended shod in an ancient pair of boots lent by Herr Panzer. These were elastic-sided, pointed-toed, much too long, with thin and shaky soles, which did not survive the climb.

The route lay through the pine woods to the left of the hôtel, the path being marked by sign-boards, the work of Bettega. These woods, like all those in the district, abound with flowers, among the most beautiful of which are *Pyrola uniflora*, and a yellow primula, besides numerous butterworts and others of more ordinary kinds. Unfortunately the weather was drizzling and misty; the muddy paths through the woods were succeeded by slippery grass slopes, and these by the gentle N.E. snow-slope. When we reached the rocky summit it was shrouded in a thick fog; and though at times there were glimpses of the valley below, and occasional peeps of the great precipices of the Cima di Ball and Sass Maor, the chief object of our expedition—to gain a view of the neighbouring peaks—was entirely lost.

The Cima di Vezzana, which has lately been proved to be the highest point of the range (10,466 feet),* lies to the N.E. of the Cimone della Pala, and is therefore quite invisible from San Martino, being shut out by the latter peak. It was first ascended by Messrs. Freshfield and Tucker, whose account will be found in vol. vii. of the 'Alpine Journal.' The climb is an easy one, the route lying for the most part over gentle snow-slopes surmounted by a short patch of rock. The view from the summit is extensive, but the most interesting feature is the eastern face of the Pala; and a good idea can be formed of the line of its ascent, which is made on this side. The face resembles the celebrated 'Platten' on

* This is the result of the new survey. My own impression, when I was on the summit of the Cimone della Pala, in 1876, was that the Vezzana was distinctly the lower of the two peaks. Messrs. Freshfield and Tucker, when on the Vezzana, in 1872, were of the contrary opinion (*Alpine Journal*, vol. vii. p. 63, vol. xiv. p. 61). W. A. B. C.

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the Dent Blanche, but is somewhat steeper, and, as it is much longer than the 'Platten,' its difficulty may be imagined. Unfortunately for us the recent snowfalls had left heavy ridges and patches of snow clinging wherever there was a crack or ledge to stick to, and we therefore came to the reluctant conclusion that an attempt on the Pala would be hopeless in its present condition. The descent of the Vezzana is most enjoyable, the long snow-slopes affording excellent glissades uninterrupted by crevasses, and we descended in twelve minutes the distance which had occupied an hour in the ascent.

The route now taken to the Cima di Ball is up the Val di Roda, the entrance to which lies between it and the Rosetta. Mr. Leslie Stephen climbed it from the other side. Last summer there lay towards the head of this valley the remains of an enormous avalanche, which fell in March and swept a wide avenue through the pine forests which clothe the lower slopes. The trees were snapped off like carrots, and their branches lay scattered in the wildest confusion. The stream which runs at the bottom of the valley was still bridged by the remains of the avalanche, while the snow of which it consisted was mixed with branches and leaves of the shattered trees. No lives were lost by the fall of this huge mass of snow, as there are no chalets in this secluded glen; but the roar was heard at a great distance, and a vast quantity of timber was destroyed by it. After crossing some easy snow-slopes the route lies to the right of the remarkable Cima di Val di Roda, the small spur to its right resembling an upturned gigantic molar tooth, whose crooked fangs must have given its giant owner some unpleasant squirms before it quitted his aching jaw. From the col just to the right of this spur we caught a glimpse of the lagoons of Venice, shrouded in a thin haze, and we hoped to have a further opportunity of viewing the queen of the Adriatic from the summit; but the mist, which almost invariably attended us on the Dolomites, was waiting for us, and we saw her no more. The rocks of the Cima di Ball are, like *most* of the rocks in this district, very firm, and afford excellent hand- and foot-hold, by reason of the numberless little cavities which permeate the dolomite. The actual summit of the mountain lies behind its apparent top, and is invisible from San Martino. The most interesting object which we saw from the top—thanks to the mist, which spoiled our view—was a fine wild goat, which had wandered up to the summit seen in the photograph. The moment he caught

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sight of us, about 500 yards away, he lay perfectly still, and no amount of shouting, though Bettega yelled like a Zulu, would induce him to betray his position. On our descent we saw, on the very top of a needle-like crag, another of these animals whose ideas of safety entirely coincided with those of our friend higher up, for he lay in his airy station absolutely motionless.

The Pala di San Martino, lying, as it does, behind the line of the other peaks, does not present so imposing an appearance as from its height and remarkable formation might be expected. In height it is the third peak in the range (9,830 feet), ranking next to the Cimone della Pala. In shape it somewhat resembles a sugar-loaf, the sides being in most directions precipitous, while towards the summit the rocks lie at a more gentle slope. M. Brulle, in his article in the 'Alpine Journal' on the Cima della Madonna, refers to the ascent of the Pala di San Martino as 'on the whole easy.' I must admit that such was not our impression of the climb. This may partly be accounted for by the fact that, owing to the persistent bad weather and recent falls of snow, the rocks in many places presented that uncomfortable condition known as 'glazed,' and indeed gave us some of the finest examples I have seen of this objectionable form of decoration.

Bettega, West, and I left San Martino one morning at 5.15 A.M.—a shockingly late hour, judged by a Swiss standard, which, however, does not apply in these regions of short climbs. Taking the path through the meadows and woods on the left of the valley, we reached the Val di Roda and crossed the avalanche before mentioned to the rough boulders on the left bank of the stream at 5.55. Here the way lies up a steep slope of rocks and loose stones, overgrown with alder-scrub and other brushwood, the track having been much improved by Bettega, who has in many places made convenient steps. At 6.30 we recrossed the torrent to its right bank, and ascended by very steep rocks and grass slopes over the stream. Finding a convenient resting-place, we halted at 6.55 for slight refreshment (the aneroid registering 1,500 feet above San Martino). Starting again at 7.20, we reached the snow in a quarter of an hour, and steered for a patch of rocks protruding from the snow-slope on our left. The rope was here attached, and the slope being pretty steep, steps had to be cut, so that we did not reach the rocks till 8.15, where we halted till 8.40. Hence we had a fine view of what was before us, the forbidding

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north face of the Pala di San Martino being almost opposite, up which lies the route. Bettega now fixed on his 'ferri,' or 'Steigeisen,' roughly made but useful crampons, which, while they enabled him to trudge along with ease up the succeeding snow-slopes, caused West and me to anathematise their use, for we found the want of steps very trying after a time. Making across the snow-slopes to the N.E. corner of the main mass of the Pala, we reached the foot of the rocks, at the highest point of the snow-slope, at 10.40. Here we unroped, as only one can move at a time, and a considerable length of rope is necessary; and here were left all the axes but one, hands being more useful in the work which lay before us. The first piece of rock—a very steep face without much hold—was so glazed with ice as to be a most troublesome bit to negotiate. Bettega swarmed up somehow, and having disappeared over our heads we soon heard a shout of 'Sicuro!' and down came the end of the rope. West tied on and followed Bettega, and, having reached him, untied and sent the rope down to me. On arriving at the place where they were waiting, about sixty feet above the top of the snow, I found West and Bettega in a most curious lie-by. Imagine a hole in the face of the cliff just large enough to contain two men sitting in a crouching attitude. This hole is most conveniently situated, affording, as it does, an excellent anchorage between the two most difficult bits on the mountain. And now Bettega practised a manœuvre with the rope which neither of us had seen before. On my arrival at the hole Bettega left it, after giving us instructions how to proceed, and climbed round the face of the rock on a very narrow ledge, somewhat resembling the Rothhorn ledge, but narrower and more broken. As soon as we heard his shout of 'Sicuro!' I wedged myself firmly into the hole, the rope between Bettega and me being tight and forming a balustrade along the face of the cliff. West then proceeded, unroped, to traverse the face, with the assistance of this impromptu banister. There is not much to recommend this mode of progression, except that time is saved by not reroping the party before this point. West being safely over, I followed on the end of the rope.

We now reroped and proceeded along the north face, the rocks being in places distinctly shaky and requiring care. A steep gully had to be traversed, quite filled with ice and bearing ominous traces of the passage of stones from above. Here our sole remaining axe came into requisition for the only time. After passing the gully we turned more dis-

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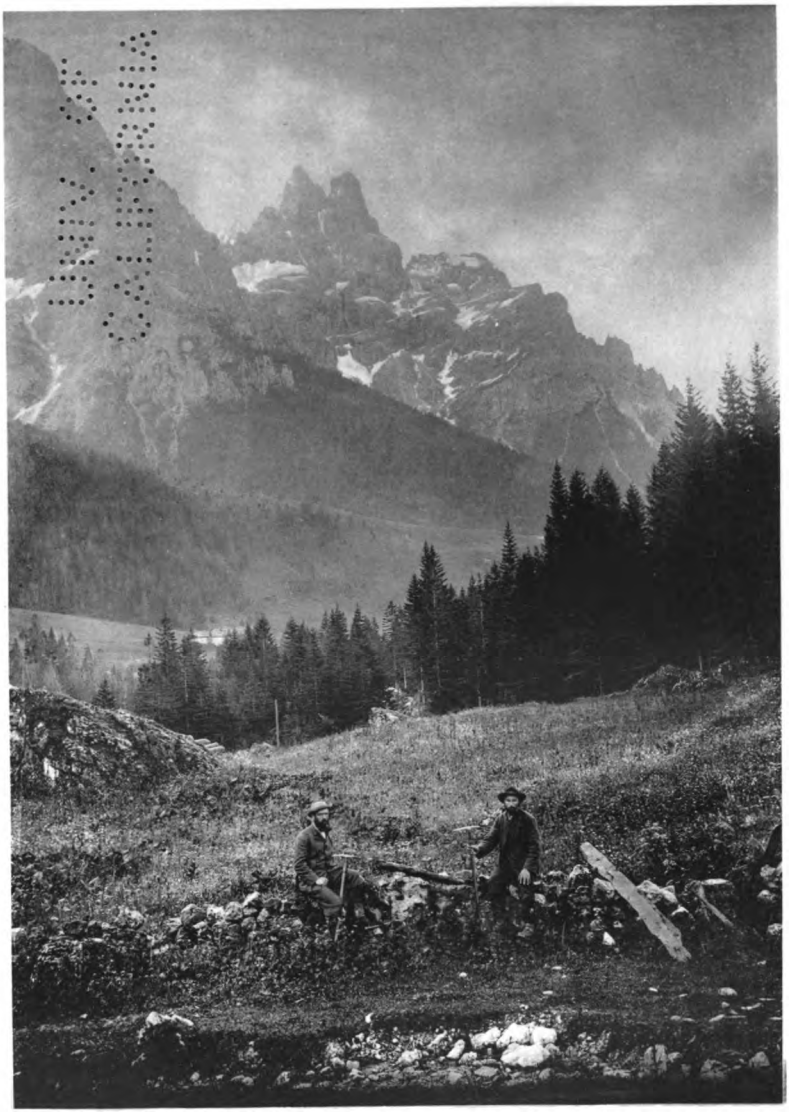

THE SASS MAOR.

From a Photograph by H. H. West.

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tinctly upwards. The rock became less steep, forming convenient ledges and steps, up which we scrambled rapidly, and reached the final snow arête at 12.10, after 2½ hours of good rock-work. This arête is broad and easy, and in a quarter of an hour we reached the summit, in which it culminates.

As usual our view was destroyed by mist; but we caught glimpses of the wonderful pinnacles and precipices of theCima di Canale, which is not so well seen from the other peaks. After resting an hour we turned downwards, reached the rocks in five minutes, and, after a repetition of the morning's performance at the hole before mentioned, reached the snow and our deserted axes in 1 hr. 50 min. In half an hour we were once more on the isolated rocks in the snow-slope, facing the Pala, whence we again contemplated its precipices, but with greater feelings of satisfaction than before. We reached the stone-slopes and unroped at 4.20, just three hours from the summit; and here we spent some time in photographing and refreshing, so that we did not arrive at San Martino till 6.5, after a most enjoyable day.

By far the most remarkable peaks in the range are the twin obelisks known as the Sass Maor (9,236 feet), which terminate the ridge at its southern end. The accompanying heliotype gives some idea of their appearance from San Martino. It is not my intention to give a detailed account of our ascent of these peaks, since a most graphic and eloquent description of an expedition on the most difficult of the two, the western summit, has appeared in the 'Alpine Journal'* from the pen of M. Henri Brulle. But I should like to call attention to one or two points in connection with that description. We had been repeatedly told, both by Herr Panzer and by Bettega, that the 'Cima della Madonna' was the higher or eastern peak of the Sass Maor, lying to the left of the group as seen from San Martino. We were, therefore, not a little surprised, when ascending these peaks, to find that the difficult one, whose ascent M. Brulle describes, is the western peak, on the right side of the group. Even after our return to San Martino Bettega and Herr Panzer adhered to their previous statement; and certainly the form of the eastern peak bears the most striking resemblance to a veiled figure seated, with the hands folded on the breast in a devotional attitude, while the appearance of the western peak does not nearly so well correspond to the title

* Vol. xiii. pp. 455–9.

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'Cima della Madonna.' A correspondence with M. Brulle and with Herr Zilzer, of Vienna, who has also ascended this peak, has failed to explain the discrepancy. I must, therefore, to prevent confusion, follow M. Brulle's nomenclature in referring to the western and more difficult pinnacle as the 'Cima della Madonna.'

The narrow neck between the two points is reached from the S.E. side by the very steep gully described by M. Brulle. When we made the ascent much time was saved and many difficulties obviated by the snow which almost entirely filled this gully and gave us the greatest help. M. Brulle has passed over with, I think, undeserved contempt the ascent of the eastern peak, merely mentioning that his party climbed it in order to get a better view of the Cima della Madonna. Now, when a first-rate rock-climber, as Bettega undoubtedly is, finds it necessary to remove his boots in order to climb rocks with safety, those rocks may, without any stretch of imagination, be called difficult; and this is a fair estimate of the peak in question. We had brought with us some light lawn-tennis shoes, in expectation of finding use for them among the Dolomites, and these Bettega wore with the greatest comfort and security on both the Sass Maor peaks, thus escaping the suffering which befell him according to M. Brulle's account of his ascent, where he describes Bettega as having his feet 'completely skinned.' The eastern peak affords a thoroughly enjoyable climb. The rocks, though in places exceedingly steep, are firm, and offer excellent if limited hand- and foot-hold, by reason of the little cavities before mentioned. The summit, when we reached it, presented an extraordinary appearance, looking as though some tremendous explosion had lately occurred. The stone-man, which Bettega said had been about two mètres high, was gone, and all the rocks lay broken and tumbled about in confused heaps. Evidently this catastrophe was of very recent occurrence, since the broken surfaces were quite fresh and many of them snow-white. The cause of the destruction must have been lightning, there having been a severe thunderstorm a few days before; and no doubt if the geological formation had been favourable we should have collected a fine harvest of 'vitrified rocks.' On its east side the summit distinctly overhangs, and a stone dropped over is not heard to touch anything as it disappears into the Val di Canale. With regard to the Cima della Madonna, M. Brulle has by no means overrated the difficulty of the first and longest gully, which has to be climbed just above the

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notch separating the two peaks. Bettega, our porter, West, and I spent an hour in surmounting this hundred feet, and a similar time was occupied in the descent. But once beyond this 'diavolo del cammino,' as Bettega called it, the rest of the climb, though very difficult, is not extraordinary, and is by no means comparable to the first *mauvais pas*.

We returned to San Martino with a much increased respect for the Sass Maor, and highly impressed by the agility and strength displayed by Bettega, whose superior on rocks it would be difficult to find.

The use of indiarubber-soled shoes on steep and smooth rocks is worthy of a more extensive trial. Those with which we provided Bettega proved a great comfort to him, both by protecting his feet and by affording a firmer hold on the rocks than stockings can. The best kind would be, I believe, the strongest leather shoes with 'red rubber' soles; ours were made of light canvas, which was in holes by the end of the climb.

The Cima di Canale (9,600 feet) lies to the E. of the Pala di San Martino, which it somewhat resembles in appearance, though it is more massive and even more formidable. It was first climbed in August 1879 by Mr. Tucker, with Bettega as guide. Of its difficulties, which are reported to be considerable, I cannot speak from experience, as we were prevented by the weather from attempting it.

Enough has, I think, been said to show that for lovers of rock-climbing this range presents many attractions. Its peaks afford opportunities for the exercise of this branch of mountaineering such as can hardly be found elsewhere in such variety and perfection. No sleeping out is necessary, and one escapes with thankfulness those banes of the great snow-peaks the tedious temper-destroying moraine, and the scorching, face-blistering snow-field. Besides the more difficult expeditions referred to there are many beautiful and interesting walks in the neighbourhood of San Martino and Primiero. Among these may be mentioned near San Martino Monte Colbricon, on the N.W., and Tognazza, on the W., facing the Cimone della Pala and commanding a splendid view of the whole range. All the woods and meadows will repay the botanist's search. Many species of orchids, including a large and handsome *Cypripedium*, three or four species of primula, and many rare ferns, such as *Lastrea struthiopteris*, *Cystopteris regia* and *montana*, grow within short distances of the hotel; while near Primiero is to be found *Asplenium Seelosii*, an insignificant but extremely rare

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fern, closely resembling *Asplenium germanicum*. From Primiero a pleasant and easy expedition is the ascent of Monte Pavione, the highest point in the Vette di Feltre range, whence is obtained one of the most extensive panoramas in the district, including Venice and the shore of the Adriatic, as well as all the neighbouring Dolomites. On the slopes of Monte Pavione and in the valleys which lead to its base the number and variety of flowers is extraordinary, the Val della Noana being particularly rich. One of the most beautiful flowers I have seen in the Alps we found among the rocks on this mountain—*Ranunculus narcissiflorus*, a very striking plant with its crown of fine snow-white flowers.

In fact, one of the great charms of the Primiero mountains is the contrast between the luxuriant maize-fields and vineyards of the valley and the varied Alpine flora of the higher regions, where gentians, saxifrages, and snow-crocuses brighten the rocks and pastures.

May and December on the Faulhorn.

By E. S. KENNEDY (formerly President of the Alpine Club).

As my life had attained the allotted space of threescore years and ten, it was evident that no time was to be lost if I were to introduce my daughter, who had not yet completed her second decade, to the old Swiss hunting-grounds. Thus it came to pass that May and December went on the tramp together.

Did such metaphorical designations presage, as in a figure, their future physical fulfilment?

Landing at Beckenried, on the Lake of Lucerne, we thence strolled idly onward to the Grand Hôtel at Seelisberg. We did not luxuriate long at that charming spot, but, crossing the Bergli, found ourselves at my old quarters in Isenthal. Here we made acquaintance with Gasser, whose children are descendants in the third generation from that Carl Imfanger who, in bygone days, had accompanied me up the Uri Rothstock.

Starting from Isenthal, we left the Hangbaum hut and the Klein Thal on the left hand, and, following the Gross Thal to the Roth-Grätli, finally descended to Engelberg. While crossing the glacier we were, like Mr. Elliot Forster, similarly fortunate, and saw many chamois, one herd on the Engelberger- and the other on the Sättli-Stock. From Engelberg we took the Joch Pass to Im Hof. A delightful bathe may be enjoyed, *en passant*, in the lovely Engstlen-See. We had now made two or three passes, and felt correspondingly elated. A few days' training had put us into tolerable condition, and we began to entertain ambitious designs. It was time to try a summit. Which should we select? Should it be the Mönch, or the Eiger, or the Schreckhorn? No! all these have been worthily described, and

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to the alpine world their names have become 'familiar as household words.' Was there, then, no peak in existence whose successful ascent had not yet been chronicled; no peak whose name was not yet associated with tales of thrilling adventure; no peak that was not yet celebrated for 'hair-breadth 'scapes' from mountain perils? Yes! There was one solitary summit still unrecorded in alpine literature; many a mountaineer had gazed at it from the Grindelwald valley, but nearly all, impelled by an irresistible influence

> to run a-foot
> Even to the frozen ridges of the Alps,

had wended their way in the opposite direction. Let, then, the neglected Faulhorn be chosen for our first grand ascent. Distinguished members of the Alpine Club may look down upon us from their towering heights with pitying wonder, and treat with scorn and contumely our humble efforts to gain distinction. One question, however, may perhaps be permitted. Have these alpine men studied their Murray with advantage? In the pages of that excellent guidebook it is thus written:—'There is a footpath from the top of the Faulhorn, passing the waterfall of the Giessbach; but it is difficult, and even dangerous, slightly marked, and not to be attempted without a guide.'

Starting, then, from Im Hof in an open 'Einspänner,' we passed through Meyringen, and, leaving our carriage some little distance before reaching Brientz, followed a path through the woods on the south bank of the lake to the Giessbach Hôtel.

We are now at the foot of our mountain, but the usual elaborate preparations for an ascent are imperceptible; troublesome arrangements with guides, vast accumulations of provisions, unwelcome disturbance of early slumbers, are all absent. Rain had fallen during the night, but the morning of August 17, 1887, broke hopefully. My daughter and I made a start, with feelings in which hope and doubt were, perhaps, intermingled; and thus May and December found themselves tracing the devious paths that so picturesquely lead up from the hotel by the sides of the foaming Giessbach Falls. Our *noms de voyage* were not altogether allegorical, nor was their signification limited to the spirit by which each of us was individually animated. As we crossed and recrossed the rustic bridges, gleams of brilliant sunshine broke in upon us through the moisture-laden foliage, and were glinted back from the dancing bubbles of our mountain torrent. It was not unlike a bright May morning in England; but we did not then anticipate that before twenty-four hours had elapsed the rigours of bleak December would prevail, and that thus the human types of May and December would find their analogue in the realms of nature.

Crossing the upper bridge, and winding up through the woods that clothe the lowest spurs of the Faulhorn, we emerged upon the slopes of the Bätten Alp; thence following the higher branch of the Giessbach we soon found ourselves enclosed by steep rocks on the right hand and on the left, while in front they assumed an almost precipitous

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character ; it was like the Happy Valley of Rasselas, all exit from which was an impossibility, and the poetic influence of the spot might have successfully tempted us to indulge in the luxury of idleness, had not stern reality been in the ascendant. We pushed straight ahead, scaled a stiffish bit of rockwork at the further extremity of the valley, and once more followed the Giessbach stream along a comparatively level piece of alp. Our friendly guide the Giessbach at length disappeared, while all trace of a path, too, had become a thing of the past. After mounting steep grass slopes, we gained the lowest edge of the highest pine woods, and here the path, restricted by the trees, became again perfectly distinct, and, thus assured that we had succeeded in preserving the right direction, we zigzagged rapidly upwards. While the pine woods had preserved our path intact, the close-growing stems of the fir-trees had at the same time concealed from us the changing character of the weather. These friendly influences of the wood had now ceased, so that, upon emerging once more into the open, we realised two rather discouraging facts; the one that the path had become almost obliterated, the other that we could not see more than fifty yards ahead.

Concurrently with the increase of mist, the doubts of December grew in strength, and the prospect of reaching the summit became simultaneously clouded over. The inevitable alternative was a strategic movement to the rear, or, in other words, an ignominious retrograde confession of failure. May, however, is the season of hope, and not a word of despondence is heard; but December looks back upon past experience, and the usual precautions are taken. We accordingly made various landmarks with stones and pieces of rock, and at occasional intervals turned, and looking backwards, studied and endeavoured to impress upon our memory those features of the scene that could be easily recognised, such as a lump of rock, or the broken stump of a tree, or a group of alpine roses. This is a precaution that is, perhaps, not often taken; but it is, I think, worthy of adoption when difficulty in finding the homeward line of march is to be anticipated. The aspect presented to the eye on the upward journey differs wholly from that which it meets with on the descent. The welcome recognition in fog and difficulty of even a limited picture gives confidence to the hesitating step, and imparts courage to the anxious spirit; the hitherto bewildered mountain explorer warms to his work with renewed hope and vigour.

We adopted, too, one other trifling expedient. It is commonly said that the thoughts of drowning men revert to the associations of their earliest days. We did not, it is true, contemplate for ourselves so melancholy a fate, but we were certainly getting into a humid condition, or, speaking colloquially, presenting the appearance of drowned rats. What wonder, then, that the literature of childhood should occur, and that in such retrospect the adventures of Jack and the Bean Stalk should occupy a prominent position! We had, however, no beans to drop, but we had a capital substitute. We had egg-shells, and these we scattered upon the ground. It is left to the reader's imagination to discover to what receptacle the eggs of correlation were consigned.

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Meantime, with every foot of ascent the mists were becoming thicker; we could see but twenty yards, and had only alpine cattle-tracks to follow. It is well known that fog possesses not only a distorting, but also a magnifying, power. Whether this power is limited to material objects may be a question; the fact, however, is incontrovertible that the alternative of a retrograde movement now began to assume much greater proportions, consequently we should not perhaps be far wrong if we concluded that the occult power of fog embraces even the immaterial world. The scales were almost *in equilibrio*, but, if the equivocal paradox may be allowed, the upward scale was still inclined to preponderate. The mountain scale and the scale in which its possibility was impartially weighed were thus in accordance. At this critical juncture human voices were heard through the gloom. My daughter and I exchanged significant glances, which, being interpreted, meant, 'Shall we seek assistance?' The thought was humiliating, but yielding to the dictates of prudence, I shouted. The unmistakable Swiss *patois* was heard in return, the clatter of wooden *sabots* sounded upon the rocks, and presently the figure of a boy loomed through the fog. 'Were we in the right direction for the top of the Faulhorn?' 'Yes.' 'Could he guide us to the inn there?' 'Yes.' 'Would he do so?' 'He would ask his master.' Boy disappeared, but soon returned and said that his master had consented.

We started at a good pace, *puero duce*. Not a vestige of a path could be discovered. Our route was over rough grass alps, then a descent into the rugged bed of a mountain torrent with V-shaped transverse section, then a scramble up the loose slippery rocks that formed the opposite side, where there was scarcely foothold, and no time for selection. Hurrying rapidly onwards, we reached the foot of very steep slopes of shale, falling away precipitously on the right hand and on the left. These we were obliged to attack *en face*, for the ridge was too narrow to allow a zig-zag; the treacherous material, evidently the result of disintegration, gave way at every step, and thus we fully appreciated the derivation that interprets the word 'Faulhorn' to mean the 'rotten or crumbling peak.' We toiled upwards rejoicingly, for two hours' good work from the last of the fir-trees had placed us at a considerable elevation, and we could not be far from the wished-for goal.

The wind was howling through the mountain gorges, and vision was limited to about two yards, when suddenly vertical rocks rose up in front of us, and lost themselves in the obscurity above. Further progress was absolutely barred. But the boy speaks, 'I wis nit wo i bi' —'I know not where I am.' Was not an expression of wrathful indignation pardonable? But there was tremor in the boy's voice, perhaps an effect of the cold; there was moisture in the boy's eye, perhaps an effect of fog; there was a catch in the boy's breathing, perhaps an effect of atmospheric rarefaction. And the words of anger remained unspoken. Every mountaineer knows how depressing is the conviction that the previous long weary grind has been worse than wasted, and has only served to create additional labour. Whatever weight may then oppress the spirit, it is essential for all to be of a cheerful counte-

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nance. But why despond? Had not the theory that the magnifying power of fog was not limited to material objects now been proved? The fog had become impenetrable, while simultaneously the alternative of a retrograde movement had become gigantic, and thus the argument had become unassailable. Our descent was rapid. On the steep ridges of shale our previous course was well defined; the watercourses, too, were of some assistance, for all fell in the same direction, and thus if a stream ran from left to right we crossed it, if in the opposite direction, we remained on the same side. The boy shouted and shouted again, but there was no answering cry, and the discouragement of silence was beginning to tell upon us, when my daughter said, 'Listen!' It was true. The joyous tinkle of cow-bells was distinctly heard; and soon through a rift in the mist three or four alpine huts scattered below us came into view. It required but little time to run down to the Sägis Alp, a spot that is rarely, if ever, visited by the alpine climber, and one which the foot of the tourist has never trodden; for is it not situated in the wildest part of a pass that 'is difficult and even dangerous'? Here we made acquaintance with Peter Abeggler, the occupier of the principal hut, and the owner of a hundred head of cattle. Peter Abeggler received us in the most courteous manner, no gentleman could be kinder; he led us through the outer chamber in which is standing room for eight or ten cows, and conducted us into the second apartment, in which were the usual apparatus for cheese-making, and the flight of wooden bars that led to the dormitory or loft above the dwelling-place of the cows. The hut itself is of the old-fashioned Swiss type, that is now fast disappearing before the advance of modern improvement. It is built up of horizontal pine logs, through whose crannies the cheering sunshine will at times sparsely gleam, while at other times rain and snow will be fiercely driven. In this hut we gladly took refuge, and almost immediately the rain, which had so long been threatening, fell heavily. Peter Abeggler lighted a fire in the stony corner of the hut; above this stockings and damp garments were hung upon our alpenstocks to dry. Our host produced clean woollen over-alls of his own for my daughter to wear, and then gave us hot milk, with fresh white bread and the purest of butter. After our repast my daughter and I threw ourselves down upon the hay above the cows, and there soon slept the sleep of him 'qui a bien dîné.'

The sun had sunk many degrees towards the west, and the storm had passed away to the eastward. It was a calm; in the far-distant valleys beneath there were sunshine and shadow, and before us, to the southward, seen indistinctly through the mist, rose up the Sägis Grat. This ridge is toothed and jagged, and doubtless derives its name from 'Säge,' a saw; it has its origin near 'Zwei Lütschinen,' and taking a north-easterly and easterly direction, culminates in the Faulhorn, having left the little Sägis See on the south, and the Sägis Alp on the north. Upon this Alp we now stood. Three courses were open for us to follow—to pass the night in the hut; to descend to the Giessbach Hôtel; to push on once again for the Faulhorn. We awaited the return of Peter Abeggler, who had gone to look after his cows; he soon returned, bringing for my daughter a beautiful wreath of

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alpine roses. 'Would he put us in the right path?' 'Yes, certainly; but he must first partially milk one of his cows.' This was for us. After a draught of new milk, and with Peter as a guide, we left the hospitable hut on the Sägis Alp, and after a rapid climb up steep and rocky grass slopes, found ourselves on the Sägis Grat. A warm hand-shaking, a hearty wish of 'Glückliche Reise,' and we parted. We may never see Peter again, but one of those striking Swiss friendships had been formed which every alpine man has experienced.

We knew the great value of time, but the heavy work of the day was beginning to tell, so that, as we followed the fairly defined path, the pace rather slackened. The mists had again surrounded us, and the shades of evening were beginning to fall; hence when the path lost itself on one of those level spots where snow-water stagnates, it seemed right to adopt one more precaution. The plan causes delay, but at the same time it almost ensures safety. One traveller remains stationary, while the other goes ahead for fifty yards; if he is still in the path the first man joins him, if he is not in the path he simply makes another trial. But now the path divided—one branch to the right, the other to the left—and doubt arises. My daughter, looking closely upon the ground, discovered the impress of a hoof. We followed this trail, but it began to descend, and once more there is a doubt. A momentary lift of the fog, however, revealed to my daughter an ascending zigzag ahead; but once again a doubt arose as we disturbed a covey of ptarmigan, for we drew the conclusion that the birds would not go to roost close to a human habitation. We shouted, but there was no answer. Soon, however, an indistinct mass loomed through the misty gloom. It was the Faulhorn Hôtel. Its doors were opened, and we were safely housed in its warmed and lighted Speisesaal. In another quarter of an hour lightning flashed through the room, thunder almost immediately followed, and an alpine storm raged around.

At daybreak the sky overhead was clear azure. Indoors the windows were frosted over, out of doors they were blocked up with snow. The storm-clouds of the past night were setting in the east, but the storm-clouds of the coming day were rising rapidly in the west. We hurried out, and were rewarded by one of those views whose impression is indelible. Every object, whether close at hand or in the far distance, was clad in the pure white mantle of fresh-fallen snow; while the whole range of alpine giants stood out in sharp distinctness against the deep blue-black background. In half an hour the alpine tempest was upon us. Throughout the day the wind howled around as it drove before it whirling masses of vapour, and hurled snow and icicles against our sheltering inn; but even its walls were not proof against the force of the blast, for many times during the day the snow was shovelled up from the floor of the Speisesaal. It was mid-winter, and thus it happened that both metaphorically and physically May and December found themselves upon the Faulhorn.

Another morning dawned, but the fury of the gale had scarcely abated. I went out early to make observations, but had not gone more than two yards before I fell up to my chest in a snow-drift. Breakfast

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soon followed, then a consultation, then a suggestion by the landlord of a sledge descent. The sledge was brought to the lee side of the house. We two, wrapped in rugs, and furnished with warm gloves, seated ourselves therein. Three sturdy men appeared, the strongest took a shaft in each hand, the other two men seized ropes, the one fastened to one side of the sledge, the other fastened to the opposite side. The inn stands upon a kind of raised terrace from three to four feet high. This difference in elevation was wholly obliterated, and the snow had become one continuous surface, or, if the *équivoque* may be permitted, the *in*equality had been transformed into an *inn*-equality. At the word 'Vorwärts' from the landlord, the men started off at right angles to the inn, and at once plunged madly into this mass of snow, when the whole cavalcade, the sledge itself, the sledge drivers, and the sledge occupants, were thrown at once into struggling confusion. We instantly recover, and are off again. The men simply take a bee-line in a southerly direction, rushing every obstacle that presents itself. Every vestige of the zigzag had disappeared, nevertheless we knew when we crossed the usual path by a sudden plunge into soft snow from four to five feet deep; and we knew, too, when we were not in the path, for then the higher side of the sledge would suddenly leap over a rock with only two or three inches of snow upon it, while the lower side would sink deep into a snow-drift, and the prospect appeared imminent that we should all be hurled into the depths below. With natural instinct, but with utter uselessness, the occupants of the sledge would then put out their hands, the upper occupant in the attempt to seize a rock, the lower one in the equally vain attempt to uphold the sledge by pressing upon the yielding snow. But our sledge drivers were stalwart men, they knew the character of their work, and they were ready at rescue; and their combined strength, rightly applied, prevented an overthrow. We knew, too, when the sledge actually ran away with us, for then all three men would throw themselves down almost upon their backs, they would gather up the snow in big heaps before their feet, after the manner of a glissade, and thus check our velocity, until we were brought up by some snow-hidden masses of rocks. The whole descent was a great novelty, and a most exciting and enjoyable experience. The pace, too, was exceedingly rapid, while the men exhibited a wonderful amount of skill and knowledge, for let it be remembered all this was done starting from a height of nearly 9,000 feet, in a gale of wind, and in a driving snow-storm. We parted from our sledge drivers at a point that the geography books would call the lower limits of perpetual snow; thence we walked the remainder of the distance, and at last May and December found themselves snugly ensconced in the Bear Hôtel of Emil Boss at Grindelwald.

This is not altogether a bad route for entering Switzerland. Between Isenthal and Engelberg the Uri Rothstock may be ascended, while Titlis may be taken between Engelberg and Im Hof. The really beautiful effects of coloured lights may be seen at the Giessbach, while by starting thence tolerably early the alpine man may get his lunch on the Faulhorn, and reach Grindelwald in time for evening *table d'hôte*; he will thus be in fair training for climbing nobler 'peaks, passes, and glaciers.'

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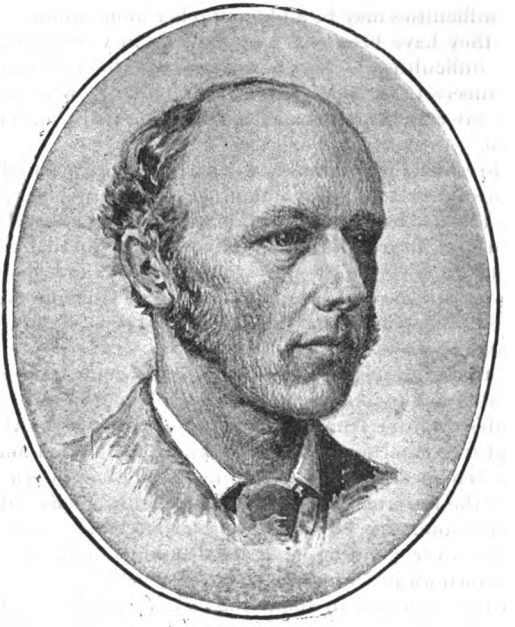

EXHIBITION OF MR. DONKIN'S PHOTOGRAPHS.

THE exhibition of photographs by the late Mr. Donkin, organised at the Gainsborough Gallery, in Bond Street, in March last, by the committee of the Alpine Club and the council of the Photographic Society, must have opened the eyes of many people to a new world. Views from heights differ so extraordinarily from views in valleys, especially in a country of snow mountains, that they have to be seen in order to be believed. These exquisite photographs, nearly all well known to members of the Club, have enabled everyone who visited the Gainsborough Gallery to study at their leisure the secrets of the snows. In the absence of some such opportunity most tourists cannot ever form any accurate idea of the great, strange world above their heads, a world where every prospect pleases, without a touch of vileness, where sky as well as earth seem to open out into 'a nobler, purer air' in a never-ending succession of distance behind distance, and where each quality of light and colour seems more refined than it is below.

What the technical difficulties may be in producing, as Mr. Donkin did, such pictures as Mont Blanc, &c., from the Aiguille du Midi (No. 284), the subtly modelled plateaux swelling and bursting as they draw slowly on towards their fall, or the Aiguille du Géant (Nos. 143 and 118), the shadowed cliff lit up from beneath by reflected light, or the Schreckhorn, &c., from the Lauteraarjoch (No. 90), the shade full of unobtrusive detail, or the plunge of the eye from the Weisshorn (Nos. 232–3), or, yet again, the superb panorama from the Schreckhorn (Nos. 98–101), where cloud and sunlight have worked together so well—

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what these difficulties may be a photographer alone knows. It is enough for us that they have been overcome; while in views 'below the snow line' other difficulties, no less perplexing to the ordinary craftsman, have been successfully combated, *e.g.* the noble view from the Col de Voza (Nos. 80–82), which rivals a painting in its breadth of effect and sense of size.

As Mr. Freshfield points out, however, in the preface to the catalogue, Mr. Donkin's interest in the mountains was many-sided; and he did not confine himself to trying to make pictures. Those who may go to the Caucasus in future years will have reason to thank him for his contributions to topography pure and simple; and districts nearer home have been made still more familiar to us since he taught photographers how to depict for us the various aspects of old friends from various points of view.

Nor has the interest been confined to the comparatively few who have been able to buy examples of these photographs, or to see them at the Club's Winter Dinners, or in shop-windows. At soirées and lectures and free entertainments of all kinds, in London and elsewhere, and for the benefit of all classes, the magic of the lantern has brought them before the eyes of thousands who will never have the chance of seeing a real mountain. This is a matter in which photography has an advantage over painting, and Mr. Donkin's industry has, indeed, not been thrown away.

One word, in conclusion, about the clouds and skies in these photographs, though there are many other points about which much might be written. Unbelievers sometimes say that mountain views are uninteresting because there are no means of judging size; and there is truth in the objection. But, apart from figures (which cannot always be placed so as to be of much use), it is often the case that nature herself in her large way supplies a rough scale by means of those clouds which we are accustomed to see from below and to think so far away. It is hardly necessary to say that Mr. Donkin has frequently seized upon these effects. He was ever trying to extend the scope of his art in this respect. And he would no doubt have succeeded more and more as time went on, though many skies must always be unphotographable. But he did secure some very fine specimens. In more than a dozen of the views shown the interest is enhanced by the magnificence of the cloud world; and perhaps one of the finest is one of the last, the view from halfway up the north peak of Ushba, in the Central Caucasus (No. 306), though the negative has unfortunately somewhat suffered as well as the others recovered from Mr. Donkin's luggage. It is impossible to look at this and the companion views without emotion, when we remember that they are among the very last works of that hand and head to which we owe so much; that he was not ever himself permitted to see the result of his skill; and that after rejoicing in the beautiful things which he has thus preserved for us, he and his comrades never looked upon the face of a friend again.

Each evening, during the continuance of the exhibition, there was a magic-lantern display of some seventy of the photographs, explanations being given by a member of the Club. A considerable number of

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spectators were present on these occasions, from first to last, and were well rewarded for coming. Photographs of snow gain peculiarly when thus shown as transparencies, the intense brilliancy of the lantern causing the snow in light to appear much more luminous than can possibly be the case with photographs seen in the ordinary way. If it were possible to combine on a large scale this quality with the advantages of the stereoscope, there would be little besides colour left to be desired. Altogether the exhibition was completely successful, having been visited by not far short of 3,000 persons. Copies of the catalogue can be obtained from Messrs. Spooner, price 6*d.*

H. G. W.

[The portrait of Mr. Donkin, which appears at the head of this notice, is from a drawing by Mr. Willink.]

MR. DONKIN'S ACCOUNT OF HIS 1888 JOURNEY IN THE CAUCASUS.

[The courtesy of Mr. E. H. Donkin enables us to place before the readers of the Journal the following most interesting letter, written by his brother a fortnight before the accident.]

Betsho, Wed., Aug. 15, '88.

I SIT in a blazing sun at a rough wooden table outside a wooden sort of barrack called a Cancellaria, one room of which we have, in a small valley, which you may roughly compare with the Zermatt valley on a smaller scale, but with an enormously larger Matterhorn at the head of it, towards the left—the great Ushba. It is still unclimbed. We have been here nearly a week, 4 days of which we spent in camp high up by the moraine under the mountain, and had two hard tries to get up the two twin peaks, but were beaten; the first time we tried the N.E. and slightly higher peak, by going up the great snow couloir between them; the weather was fine but too warm, so the snow was not hard enough, and it became dangerous from avalanches. We had to keep upon the rocks at the side, which were very difficult, and at last it was a choice between the steep snow and its risks and a defeat; so, though you may imagine the disappointment, we turned back and came down again. Even then we were not free from risk; huge avalanches had already fallen, and we had to run and slide down the slopes as fast as we could, tumbling through the masses of ice and snow débris till we were clear of avalanche tracks and could take it easy. Even so we were out for 13 hours and hard at work all the time. That was Saturday last. On Sunday we rested, and on Monday we had a try at the S.W. peak, from the S. arête. This avoids all risk of avalanches and we hoped for success. The telescope had shown that most of the route was easy except one hard bit below the top. It was an enormously long climb over the lower rocks and snow gullies, nowhere very steep, but very tiring just because it was easy enough to go fast. At last however we were brought up against a cliff; *the* great cliff which guards the top, and such a tremendous wall of forbidding precipice I never saw before. It is

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nearly ½ a mile wide, and a magnificent and spotless field of snow hangs below it, sweeping down at a fearfully steep angle into the valley below. We were on a ridge abutting against the right-hand end of the cliff, and anxiously did we scan it for a possible way up. In the middle was a great crack from top to bottom, full of icicles; immediately over our heads the rocks went almost sheer up, solid and firm, but such little projections as there were sloped the wrong way and gave no hold whatever. Streich was not very well, and evidently did not think it possible. However we put down all the baggage, and had a try at the lowest rocks. We got up a little way, a very little, and then got hopelessly stuck. Fox, who is a most enthusiastic climber, wanted to try the ice gully, but merely to get near it involved getting up an overhanging slab of vertical rock, which I declared was impossible; indeed, I had mentally given it up on first inspection. Once up those 400 or so feet of precipice, all would have been easy, as the top slope is gentle; but it was hopeless, so once more we had to accept defeat, and turned downwards. Before doing so, however, we built a little cairn, and I took a boiling-point to determine the height we were at—nearly 15,000 feet. As we descended the interminable ridges of broken rock the clouds swept up and a little snow fell, but lower down we got into finer weather again. Ushba is its proper name—the rain peak. Seldom is it free from cloud; but the first two days here it was clear and I have got several good photographs of it. We had started at 2 A.M. and did not get back to camp till 6 P.M.; 16 hours out and the hardest part left undone. . . . But you will like to know more generally how we have fared. We left Constantinople on Sat. July 29 and had a fine passage to Batoum, touching at several southern ports, and landing for a few hours at Trebizonde on the Tuesday. Next morning we reached Batoum and expected much trouble with the Custom House people, but, as I told you in my letter from there, we got through wonderfully easily. Next morning we left by the 8 train for Kutais, arriving at 2. We were met by Rieger, our interpreter, an elderly German with short grey hair, very brisk and energetic, and we soon found him an excellent courier and general manager. Kutais is a good-sized town with a fair hotel. By hard pushing and much bustle we managed to pack all our goods and ourselves on eight horses by 6 o'clock the same afternoon, and rode out of the town a motley cavalcade, greatly to the amusement of the lazy inhabitants. A good road goes for many miles gently up the Rion valley, but we could not do more than 10 or 12 that night, and we stopped at a duchan, or roadside wineshop, for the night. We got a fairly clean room, and lay in our sleeping-bags till early morning, when we rode on again. On and on all day—very tiring—to another duchan. Meals all anyhow, occasionally a tinned soup, but mostly brown bread, milk, and occasionally a chicken or a few eggs. The scenery became finer and the hills covered with beautiful forests, but the snow mountains not yet visible. On the 3rd day we crossed a pretty grass col into the Zenes Tshkali valley (Horse River), the road becoming now only a path. Scenery much finer and the valley a most beautiful one. By about 6 we arrived at Lentechi, and after some parleying put up at a biggish farm-house with a large first floor

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balcony, accessible only by a clumsy ladder. This we took possession of, the inhabitants gaping at us as we unpacked our things and got ready for the night. We had bought a sackful of good bread at Zagiri, the last place with anything at all like a shop. From Lentechi our plans were to send Rieger and 2 natives with the horses and bulk of the baggage round by the well-known Latpar pass into Suanetia, while we 3 and 2 guides and 2 native porters intended to cross the Leila chain direct northwards to this place, if possible climbing the highest point of the range on the way for the sake of the splendid panoramic view of the main chain it must give. We failed, however, in this, and only managed to cross by a pass known to the natives. The difficulty of making them understand our object is almost insuperable. The glens and ridges, forest-covered and all but impenetrable, make it impossible to do without the natives; they alone know where there are paths, and they won't leave them, and the idea of going up a mountain where there is no path instead of crossing at a lower point where there is one is naturally to them the wildest folly. Well, the result was that as we rose up the steep grass slopes under a blazing sun we gradually made out our whereabouts, and saw Leila far away westwards 2 or 3 days distant, deep gorges intervening; so we of course gave it up and accepted the native daroga, or path. When I tell you we slept out *twice* before reaching the comparatively low col we were making for, you will see the kind of distances we had to go. However, this was partly due to our being entirely out of training and also to Dent not being very well. On the 3rd day we reached the pass and looked over the ridge for the first time down into Suanetia, the great wide valley of the Ingur with the main chain on the north. But, ah, what a distance away! We stopped there an hour and a half, photographing and taking angles and notes; the day was fine, but clouds hung partly over the snows, giving us occasional glimpses only of Ushba, straight opposite. We hoped to get down to Latal that evening and meet the horses, and started down the gentle snow slopes merrily enough. Soon however we got into difficulties: the gorge we were in, leading down to the Ingur valley, was very long, and intersected by other gorges that involved long detours; our two natives evidently did not know the right way, but late in the afternoon we struck into a good path which took us down to the water, and we hoped we were all right. But it went on and on, and it got late, and we saw we must camp out once more. We settled to move on a little further, looking for a convenient spot. The path turned upwards to the left, the river trending to the right; we went on further, moved more up through the forest, wondering how much higher it would go. Evidently it took us over a spur, and we should soon drop down to another stream the other side. We were very tired and were carrying heavy loads. Up went the path suddenly, very steep; the forest impenetrable either side; no water or level spot, so we *had* to go on, though gasping and nearly exhausted. Imagine reaching Zermatt late in the afternoon very tired, and finding you had to go up to the Riffelberg. Nearly half as high again did we toil up through that wood, till at a small clearing we dropped on the grass and one and all declared that if water could

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be found we would not budge another step. Fischer, our sturdy young porter, dived down into a little dell and soon shouted out 'Wasser!' so, greatly relieved, we set about lighting a fire. By cutting a lot of leaves and pine twigs we made comfortable beds and slept well. Next morning we went on early, climbing at least another 500 feet before we topped the ridge and went straight down the other side, quite as steep and far, down to the other stream. The wholly unnecessary cruelty of such a path, when it might just as well go round the spur below, is one of the puzzles of this wild country. Further on we crossed a big stream by a ricketty bridge, and getting up on rising ground came in view of the square towers of Latal. We had crossed the Ingur without knowing it! The complexity of the gorges and mountain spurs is very great. At Latal, a very poor place, we found Rieger and the horses and baggage, and a Suanetian boy whom we had found at Zagiri and had brought with us (*i.e.* with Rieger's party), a handsome young fellow of about 16, who really wept for joy at our arrival and kissed our hands. It was a lovely morning, nearly cloudless, and it was a great relief to get into the saddles again and ride over the short and easy little pass down into this valley. At the top of it, turning a corner, we came full in sight of Ushba, such a magnificent view, nearly the same as the engraving in the last 'A. J.' Of course I got the camera out and took 2 views. . . . Betsho is a very poor little place. It is with the utmost difficulty we can even get bread, and that only through the Russian Priestav, or military commandant, who is stationed here, a melancholy reserved sort of man, who, however, has entertained us to supper twice, and has really done a good deal for us. Dent, I am very sorry to say, is not well enough to climb, and is going home. Fox and I are very well indeed, and are going on. We leave this to-morrow, crossing the chain northwards and making for Bezingi and the Koshtantau district, after exploring the glaciers just north of Ushba. . . .

W. F. Donkin.

THE EARLY EXPLORERS OF THE CAUCASUS.

By DOUGLAS W. FRESHFIELD, Hon. Sec. R.G.S.

At the close of 1887 a volume containing the biographies of some leading Alpine guides, written by various hands, and entitled, 'The Pioneers of the Alps,' was published in London and reviewed (February 1888) in these pages. The excellent photographic portraits and illustrations contributed by Captain Abney, F.R.S., give the work a permanent value, and it has recently (October 1888) been issued in a second popular and less expensive edition. I have been reluctantly compelled to call attention at the Alpine Club to certain statements affecting the early explorers of the Caucasus to which the editor, Mr. Carus D. Cunningham, has devoted in this second edition a new page in his introductory note. I must here repeat—as far as is consistent with needful condensation—Mr. Cunningham's allegations in his own language.

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'*It probably required considerably more strength of character than we perhaps appreciate for some of these guides to start for far-distant countries, where they vaguely imagined they might encounter adventures similar to those they may have read of during the long winter evenings in some popular Penny Dreadful book of travels. . . . From all we can learn, the difficulties of the expeditions to the Caucasus have been unduly overrated and magnified; not by any means intentionally, but simply from the fact that none of the little band of early explorers had ever travelled in a really rough country. The small contretemps of travel they encountered were simply those such as any Englishman unacquainted with the habits of the people, the language, or unprovided with proper introductions could not but fail to meet with* (sic) *in any Russian territory which the Messrs Cook had not succeeded in opening up for the tourist. . . . The height of the mountains of the Caucasus always conveys a most erroneous idea of their difficulty. . . . That there are difficult peaks in the Caucasus no one can deny; but they are still unascended. The guides who have been taken from the Alps to this 'great field for exploration,' have usually been called upon to display those qualities we associate with a Dragoman. The brothers François and Michel Dévouassoud have explored the Caucasus, a district which has been visited by Peter Knubel, and also by Alexander Burgener.*'—'Pioneers of the Alps,' 2nd ed., pp. 28–9.

I shall hardly be accused of presumption in taking these remarks as intended to reflect primarily on the first Alpine Club explorers of the Caucasus, the party of 1868; at any rate, if they were not so intended, that must be their effect on the general reader.

Most mountaineers who have climbed or explored in distant regions have learnt to 'suffer gladly' the comments of those to whom their form of travel is foolishness. But it would be unjust as well as unmannerly to extend sufferance on these terms to one who is a member of the Alpine Club and the editor of 'Pioneers of the Alps.' That, to the best of Mr. Cunningham's belief, I and my companions, Mr. Comyns Tucker and Mr. A. W. Moore, combined twenty years ago to present to the public a very exaggerated picture of the difficulties and dangers of Caucasian exploration, is no doubt a misfortune for the Geographical Society and the Alpine Club! But it is a misfortune, some may think, which might, under all the circumstances, have been borne silently, with a resignation grounded on faith in truth and time. Had these reflections fallen only, or chiefly, on myself, I might have been disposed to ignore them. But Mr. Cunningham has made his beliefs—or his scepticism—the ground of studied disparagement of the risks run and the professional skill shown by my veteran guide François Dévouassoud, of Chamonix, disparagement which I cannot consider as palliated by the compliments he is pleased to pay to him as the '*doyen* of the pioneers who have set out to' distant ranges, or to his social and literary attainments as a 'clever and intelligent man of the world.' Dévouassoud's friends—and mine—will understand that I feel bound therefore to show publicly what these beliefs of Mr. Cunningham's are worth; that inserted, as they are, in a volume to which I have myself contributed an authentic biography of my

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comrade, I cannot allow them to pass uncorrected. But it is due to all concerned to add here that, before publishing this correction, I have been careful to submit it first to Mr. Cunningham, in the hope—a hope that has been disappointed—that by some step on his part he might relieve me from the very unwelcome necessity of recording in a permanent form the fallacies of a fellow-member of the Alpine Club.

Mr. Cunningham has told his readers that he relates to them the result of 'all we can learn.' All he has learnt in this instance is fiction—the exact contrary to the plain facts as long since published. He has been the too willing victim of an inexcusable mystification. I will prove in as few sentences as may be what I have here asserted.

Before entering the Caucasus all our party had seen much of mountain travel, and three of the four had previous experience of eastern travel in the wilds of the Hauran and Armenia. Our interpreter, a Caucasian by birth, and an excellent linguist, had been secured for me by Mr. Gifford Palgrave (then Her Britannic Majesty's Consul at Trebizonde and previously at Sukhum Kaleh), whose body-servant he had been in his Abkhasian journeys. We were furnished with introductions to General Ignatieff, then Russian Ambassador at Constantinople, to General Loris Melikoff, then Governor of the Terek, to Count Levershoff, the Governor of Mingrelia, and to Baron Nicholai, the Viceregal Secretary at Tiflis, to General Chodzko, the head of the Caucasian Staff, as well as to Doctors Radde and Abich, the well-known savants, from all of whom we received valuable assistance. Our difficulty lay, not in any lack of introductions, but in the fact that we persisted in going into districts where Russian introductions did not at that date run. The country was not thoroughly pacified until many years later—after the war of 1877. In 1864, Dr. Radde, a Government traveller, had suffered robbery, and been forced to slink by night through certain villages in Suanetia to avoid outrage; even in 1876 he met with serious difficulties among the Chetchens. In 1868 travel was more or less dangerous in several parts, highly dangerous in Suanetia. François Dévouassoud, shut up in a barn at Jibiani by a mob armed with naked daggers and loaded guns, had no need to draw on his imagination for a picture suitable for 'a Penny Dreadful'!

In 1869, and again in 1875 and 1876, there were disturbances both in the east and west of the Caucasus, and Free Suanetia resisted the Russian authority in arms.

Captain Telfer, R.N., relates how in 1875 two Russian travellers were refused shelter for the night at Ipari (Suanetia), 'notwithstanding the personal request of the chief' (of the district, Colonel Hrinewski) 'and the official documents with which they were provided.' Again he writes, 'The natives decidedly refused to supply us' (Colonel Hrinewski and Captain Telfer) 'with food at any price except on two occasions. The fact is that the Swanny dislike the intrusion of strangers, and especially of those wearing the uniform of the monarch who claims them as his subjects.' *

* Telfer's *Crimea and Transcaucasia*, vol. ii. pp. 101 and 120. London 1876.

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In 1876, Captain Telfer's friend, the Russian officer in command of the district, was, with five companions, murdered in cold blood in a barn a few miles from that in which we were mobbed. The incidents were described in detail by Captain Telfer in the 'Times' of January 22, 1877. Two years ago I saw the razed battlements of the hamlet where this outrage occurred.

Owing to the slow but sure pressure of Russian rule, such 'small contretemps of travel'—as Mr. Cunningham humorously calls the possibility of murder—are happily no longer to be feared by travellers. A Jewish pedlar is about the highest game a free Suanetian now ventures to sacrifice to the hereditary instinct of a race amongst which, as Dr. Radde records, 'individuals who have committed ten or more murders' were lately common.

My friend, Mr. Comyns Tucker, was no doubt a little premature in 1884 * in writing that robbery also was at an end in Suanetia. My own experience in 1887 proved the contrary.† Yet our solitary misadventure at Adish was an exception; and the speedy punishment that, thanks to the energy of the Russian priestav, fell on the robber-hamlet, may probably render this the last exception to the general rule and experience of recent travellers. I have been, it is true, courteously remonstrated with by my late companion, M. de Déchy, for *under*estimating the present difficulties of Caucasian travel. ‡ M. de Déchy speaks on the strength of four years' experience, and has a right to be heard. But I think he agrees with me that the country as a whole has improved, and is improving yearly, and that the frequent passage of travellers has in many districts smoothed the way of their successors—as long as the latter bear themselves with prudence, patience, and discretion. Yet so far are the Suanetians from having lost their bad name that last autumn, when the disappearance of Mr. Donkin's party first became known, the suggestion made both by Mr. C. Phillipps Wolley (the author of 'Savage Suanetia') and by officially-connected residents at Tiflis was that the travellers had met with violence among the Suanetians. The supposition in the particular instance was impossible; the experience of the past two summers has taught English travellers to believe that under any circumstances it would have been highly improbable. Yet it had, as I have shown, some *primâ facie* justification in comparatively recent events.

I trust that I have made it sufficiently clear—I might, had I space, multiply proof indefinitely—that François Dévouassoud fully deserves any credit he may have got for courage in facing twenty years ago murderously disposed barbarians. I must now show still more briefly that the suggestion that he, in common with other guides taken to the Caucasus, was chiefly employed as a 'Dragoman,' is as groundless as it is likely, should it meet with any credence, to be mischievous in inducing rash attempts by unpractised travellers.

I will not quote from my own book, 'The Central Caucasus,' published in 1869. My companion, the late Mr. A. W. Moore, C.B., formerly

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* *Alpine Journal*, vol. xi. p. 429. † *Proc. R.G.S.*, Nov. 1887.

‡ *Österreichische Alpen-Zeitung*, Jan. 25, 1889.

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head of the Political Department at the India Office, and Hon. Secretary of the Alpine Club, compiled a diary of our journey, which was printed in the 'Alpine Journal' (vol. v., pp. 160–6). It would take a daring man to dispute Mr. Moore's competency and rigid accuracy in any matter of mountaineering. I find on looking back the following entries:—*Kasbek*, 'steep and dangerous ice-wall, costing four hours' work.' *Gurdzievsk Pass*, 'snow-couloir of excessive steepness.' *Karagam Pass*, 'six hours in a bad ice-fall.' Such entries from such a pen may be left to speak for themselves to all competent readers. Members of the Alpine Club will have no difficulty in deciding between Mr. Moore, the eye-witness, and Mr. Cunningham, the compiler and critic.

But I cannot resist asking Mr. Cunningham—Does he know what a 'Dragoman' (even spelt with a big D!) is, that with these entries before him he can write—what he has written? Has he realised that up till now no single great peak of the Caucasus has been climbed without an Alpine guide—not even Elbruz, though it has been attempted over and over again by brave and hardy men, Cossack soldiers and native hunters?

A famous 'Alpinist,' of Tarascon, a few years ago persuaded himself that the difficulties and dangers of the Alps were 'put up.' He submitted 'all he could learn' to the test of personal experience, and returned to Tarascon a wiser man. Mr. Cunningham has not yet proved his 'learning'; he has to some extent let the time pass by for fairly proving it. Yet even now if he will do with a dragoman all François did in 1868 and 1887, I think I may safely promise him that on his return he will have the material for a volume 'Sur le Caucase' almost as entertaining as his predecessor's 'Sur les Alpes.'

With regard to a subsidiary statement, whether intended as a compliment or the reverse, that '*François Dévouassoud passed several years at a Jesuit Seminary with a view to entering the priesthood of that powerful body: he however abandoned the idea, returned to his native valley, and joined the Société des Guides instead*,' François wishes me to say that there is not a word of truth in it.

I ought, perhaps, to add that readers must not assume, because I refrain here from any further corrections, that there are not many other passages in Mr. Cunningham's portion of 'Pioneers of the Alps' which in my opinion ought never to have been written, and stand greatly in need of correction.

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TWO EARLY ACCOUNTS OF GLACIERS.

[The following notices are two of the earliest, if not the very earliest, known accounts of glaciers published in English, and will therefore have a special interest for readers of the 'Alpine Journal.' The former is taken from No. 49 (pp. 982–3)—June 21, 1669—of the 'Philosophical Transactions' of the Royal Society; and the latter from No. 100 (pp. 6191–2)—February 9, 1673–4—of the same publication. The well-known letter on the glaciers of Grindelwald, written by William Burnet to Sir Hans Sloane, appears in the same publication for the year 1709.]

I.

Extract of a Letter, Written by Mr. Muraltus *of* Zurich,* *to M.* Haak, *a Fellow of the R. Society, concerning the Icy and Chrystallin Mountains of* Helvetia, *call'd the Gletscher. English'd out of Latin by the Publisher, as follows*;

THE highest Icy Mountains of *Helvetia* about *Valesia* and *Augusta*, in the canton of Bern; † about *Taminium* and *Tavetsch* of the *Rhaetians*, are alwayes seen cover'd with Snow. The Snow, melted by the heat of the Summer, other Snow being faln within a little while after, is hardned into Ice, which by little and little in a long tract of time depurating it-self turns into a Stone, not yeilding in hardness & clearness to Chrystall. Such Stones closely Joyned and compacted together compose a whole Mountain, and that a very firm one; though in Summer-time the Country-people have observed it to burst asunder with great cracking, Thunder-like; which is also known to Hunters to their great cost, forasmuch as such cracks and openings, being by the Winds covered with Snow, are the death of those, that pass over them.

At the foot of these mountains are with great labour digg'd out Chrystals, which are found among other fossils, of two sorts and colors; some of them are darkish and troubled, which by some are call'd the Chrystal-ore, to be plenteously found in the ascent of Mount *Gotthard*; others transparent, very pure and as clear as Venice-glass; sexangular, great and small: as in the mountains about *Valesia*, and the town call'd *Urselen* at the foot of the Hill *Schelenin* ‡ they are digg'd out, and sold at a good rate. Of this latter kind, my Parents,

* [Johannes von Muralt (1646–1733) was a distinguished medical man, mathematician, and physicist of Zürich, who had pursued his studies in England. Herr B. Studer (*Geschichte der physischen Geographie der Schweiz bis* 1815, p. 170) thinks that this letter was probably not based on his own observations, as he was then only twenty-four years old. Later his botanical explorations in Switzerland were very extensive: he published descriptions of them in 1710 and 1715.]

† [The translator probably imagined that the Valais and Aosta had something to do with the canton of Bern.]

‡ [? Urseren Valley and the gorge of Schöllenen leading up to its entrance. It is to be noted that it was at the head of one of the glens of the Urseren Valley that in 1867 there was found, high up above the left bank of the Tiefengletscher, the finest crystal cavern discovered in this century. See Herr R. Lindt's detailed account of it in the fifth volume of the *Jahrbuch des S. A. C.*]

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four years agoe, transmitted a very bigg and fair one to *Milan* for 80 pound sterling.

This is, what I have observed about these Hills; What I shall farther learn of the people, inhabiting thereabout, to whom I have written a month since, I shall impart to you.

In *September* 1668.

II.

A farther Description and Representation of the Icy Mountain, called the Gletscher, *in the canton of* Berne *in* Helvetia; *which was formerly taken notice of in* Numb. 49 *of these Tracts.*

This account was imparted to us from *Paris* by that worthy and obliging person, Monsieur *Justel*, who had received it from a trusty hand living upon the place, as follows; The Icy Mountain, of which I have sent you the Scheme (*See* Tab. 2), deserves to be view'd. The letter *A* signifies the Mountain it self, which is very high, and extends it self every year more and more over the neighbouring meadows, by increments that make a great noise and cracking. There are great holes and caverns, which are made when the Ice bursts; which happens at all times, but especially in the Dog-days. Hunters do there hang up their game they take during the great heat, to make it keep sweet by that means. Very little of the surface melts in Summer, and all freezeth again in the night. When the Sun shineth, there is seen such a variety of colors as in a Prism.

B is a rivolet, issuing forth from under the Ice, which is pretty deep and extremely cold.

C are the Hutts, that were built at the beginning, at a considerable distance from the Mountain; but at present they are nigh to it by reason of the continued increase which this Ice maketh.*

There is such an other Mountain near *Geneva* and upon the *Alpes*. A certain *Capucin* told me, he had been upon the highest of these mountains with a Trader in Crystal, who having driven his hammer into one of these Rocks, and found it hollow and resonant, made a hole into it, and thence drew forth a substance like *Talk*; which to him was a sign there was Crystal. After which he made a great hole with Gunpowder, and found Rock-crystal in it.

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* [This notice is accompanied by a rather rough plate representing the Wetterhorn, Mettenberg, Viescherhörner, Finsteraarhorn, &c., and a bit of the Eiger, with the Lower Grindelwald glacier (*A*), the Lütschine (*B*), and some houses (*C*) on its right bank. It is quite recognisable, and is apparently the earliest known view of that glacier, with the single exception of that published in Merian's *Topographia Helvetiæ* in 1642. The one in the *Philosophical Transactions* is taken from precisely the same standpoint as Merian's, and looks as if it had been copied from a drawing on a small scale made after Merian's plate.]

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IN MEMORIAM.

ULRICH KAUFMANN.

In the last number of the 'Journal' (p. 249) the death, on January 11 last, of this old Grindelwald guide was announced, and a short list given of his chief expeditions. He had practically retired from the exercise of his profession as a 'Gletscherführer,' and was probably known to a few only of the members of the Alpine Club. Yet his Alpine career was a remarkable one, and it is but a fitting tribute to the memory of one who as early as 1864 was included among the seven men who formed the 'Old Guard' of Grindelwald guides * that some account of him should appear in these pages. I have been much aided in drawing it up by his *Führerbuch*, which has been placed at my disposition by one of his nearest relatives.

Kaufmann was born about 1837, and his early life no doubt was spent in the usual Oberland fashion. He was introduced to the mountaineering world through Christian Almer, who in 1846 had married Kaufmann's sister Margaret; for Almer and Kaufmann were the two hunters who so much troubled Mr. Wills's mind when making his famous ascent of the Wetterhorn in 1854—the expedition which is generally held to mark the beginning of modern mountaineering. They were together in later days on several climbs, such as the Mönch in 1857 (first ascent), the Jungfraujoch in 1862 (first passage), and the Gross Viescherhorn in 1862 (first ascent). But Kaufmann was not always in attendance on his more celebrated brother-in-law. In 1861 he was one of Mr. Stephen's guides on the first ascent of the Schreckhorn,† being already known to him, as they had been together on the Wetterhorn in 1860. In 1863 he was with Mr. Chater and Mr. Hopper on the second ascent of the Gross Viescherhorn, which, as recent enquiries have shown, was effected by the S.W. face and the last bit of the N.W. arête. By 1864 he had been up the Aletschhorn and the Klein Schreckhorn, while in 1864 he accompanied Herr von Fellenberg on the occasion of the first ascent of the Ochsenhorn. Kaufmann's name is thus associated with very early ascents of nearly all the great Oberland peaks, and he seems scarcely ever to have been away from his native district, his book indeed containing the record of but one journey (in 1868) to Zermatt and Saas. He appears to have retired from active work as guide at the end of the summer of 1871; for, though his book has the official stamp for 1879 and a few later years, the only entries after 1871 are one in each of the following years: 1885, various unspecified ascents in the Oberland; 1886, Schwarzhorn, Mönchjoch, Oberaarjoch, and Strahlegg; and 1887, Zäsenberghorn. For some part of this time

* *Jahrbuch des S. A. C.*, i. 574.

† This is expressly stated by Mr. Stephen in a note in Kaufmann's *Führerbuch*, dated August 31, 1865 (his first book having been lost), and hence the name Christian Kaufmann in the original narrative of the ascent (*Peaks, Passes, and Glaciers*, 2nd series, vol. ii. p. 6) must be corrected to Ulrich Kaufmann.

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he was, I am informed, landlord of the Great Scheidegg inn, and later also of another inn in the valley. About 1883 or 1884 he started work as a guide again. His book is stamped for 1888, but was not utilised; for his increasing ill-health made it impossible for him to act as guide. As far as I can recollect (and there is no evidence to the contrary in his book) he never accompanied me as guide; but in the latter years of his life I became acquainted with him in respect of certain non-Alpine matters, and came to have a great liking for him personally, as well as a great respect for him as one of the chief among the early explorers of the great peaks of the Oberland. Possibly he did not attain the very foremost rank in his profession (though he was not far behind it); yet the future writer of the Alpine history of the Oberland will not often have occasion to mention the name of a more creditable specimen of the average Grindelwald guide than old Ulrich Kaufmann—as he was called, to distinguish him from a younger man of the same name who has made himself a name in the Himalayas and the Alps of New Zealand.

W. A. B. Coolidge.

ALPINE NOTES.

The Discovery of the Finsteraarhorn.—It is interesting to recall the fact that it is just one hundred years since the Finsteraarhorn (or, as it was called on the Valais side, the Schwarzhorn *) was introduced to travellers as the highest peak of the Bernese Oberland. This took place through the publication in 1789 of the second edition of Archdeacon Coxe's 'Travels in Switzerland,' which, particularly in its later forms, is by far the best work on Switzerland as a whole that has yet been written in English. In his fifty-ninth letter or chapter he presents us with a very neat large-scale view of the Alps as seen from the environs of Bern, which, as well as the accompanying letterpress, he procured (no doubt on one of his visits to Bern in 1785 and 1786) from Samuel Wyttenbach, a well-known *Pfarrer* and naturalist resident in Bern, who published much about mountains (including, in 1777, the first guide-book to the Oberland) and explored the Bernese Alps more carefully than any man had hitherto done. Here is his description:—'The high peak, which appears to stand near the Zesenberg,† is at a very considerable distance, and probably separated from it by large vallies of ice. This peak, that has hitherto escaped the mention of travellers, seems to be the Finster-

* G. Studer, *Das Panorama von Bern*, 1850, p. 218.

† In the panorama the name Zesenberghorn is given to the peak now commonly called the Ochsenhorn, while in the text (p. 301) we read: 'You observe behind the Exterior Eiger [*i.e.* the Eiger proper as distinct from the Inner Eiger or Mönch] two small peaks, which seem united by a ridge: these are the Viescherhorn and the Zesenberg, which overlook the inferior glacier of Grindelwald.' On the other hand, the name 'Fiescherhorn' is distinctly given to the Ochsenhorn on Plate 172 of Zurlauben's *Tableaux de la Suisse* (1777–1780). The name Viescherhorn occurs as early as 1723 in Scheuchzer's *Itinera Alpina*, p. 289.

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Aar-horn, which can only be approached from the Grimsel; and by traversing the glacier of the Aar. I have seen it from the summits of the St. Gothard, from one of the heights which separate the valley of Grindelwald from the lake of Brientz; I have been at its foot upon the glacier of the Finster-aar; and on all sides, and in all places, its elevation is stupendous, and appears to me to exceed even that of the Schreckhorn, which has been hitherto considered as the highest' * In the 1801 edition of the same work † the same passage is repeated (though the panorama is a mere shadow of itself), and it is added, 'This conjecture of M. Wittenbach is confirmed by actual measurement taken geometrically by Tralles,' according to which the Finsteraarhorn is 14,116 feet, while the Schreckhorn, with 13,397 feet, ranks as fourth only of the Oberland peaks, being beaten by the Jungfrau and Mönch, the Aletschhorn being, as usual in these early lists, entirely overlooked.

Records Left on Mountain-Tops.—Attention has been called several times recently in these pages ‡ to records which have been found on high peaks after a lapse of many years. Curiously enough the case which seems to stand at the head of the list has not yet been mentioned here, though the twenty-seven years which elapsed between the original writing and the finding is a far longer period than any yet noted. This is the case of the Gross Lauteraarhorn, the first ascent of which was made on August 8, 1842, by MM. Desor, Escher von der Linth, and Girard. This party tied a bottle (as well as a flag composed of two red handkerchiefs) to a stick, which was set in a cairn. 'Une autre bouteille fut placée dans un petit caveau à côté du drapeau sous une grosse pierre; elle renferme un billet sur lequel sont inscrits nos noms et la date de notre ascension, avec quelques remarques confidentielles adressées au premier lecteur.' § The second ascent of the peak was made on August 22, 1869, by Herr Eduard Burckhardt-Zahn, who found this bottle sticking out of the snow. The plug which stopped it up had been nearly worn away by wind and storm; but the 'billet' inside was in good preservation and easily deciphered, for even a satirical allusion to any later climber who could not give an opinion as to the geological character of the rocks forming the peak was clearly made out. ‖ Apparently Herr Burckhardt did not take away this curious relic, but it was missing on August 9, 1885, when Herr Emil Burckhardt made the ascent. ¶ It may be noted here that the pole found on the summit of the Gross Viescherhorn in 1885 ** was certainly not the original fir tree left in 1862 on occasion of the first ascent. Pfarrer Gerwer, of Grindelwald, describing the fourth ascent of the peak on September 12, 1865, expressly says †† that his party took away the fir tree to be used as an alpenstock, and planted a flag-staff instead, which was found by Mr. Coolidge in 1872, and is probably the pole noticed in 1885.

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* 1789 edit. ii. 301–2. † ii. 320–1.
‡ Vol. xii. p. 467; vol. xiii. p. 129; vol. xiv. p. 38.
§ See Desor's *Excursions et Séjours dans les Glaciers*, 1st series, pp. 551–2.
‖ *Jahrbuch des S. A. C.*, vii. p. 288. ¶ *Ibid.* xxi. p. 52.
** *Alpine Journal*, vol. xii. p. 467. †† *Jahrbuch des S. A. C.*, iii. p. 281.

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ANOTHER SNOW MOUNTAIN IN CENTRAL AFRICA. — A rival to Kilima-njaro has been discovered by Mr. H. M. Stanley during his journey to relieve Emin Pacha. Writing to the Emin Pacha Relief Committee on August 28, 1888, from Bunganeta Island, Ituri River or Aruwimi River, he says, 'North and south of our track through the grass land the face of the land was much broken by groups of cones or isolated mounts or ridges. North we saw no land higher than about 6,000 feet above the sea; but bearing 215 deg. magnetic, at a distance of about 50 miles from our camp on the [Albert] Nyanza, we saw a towering mountain, its summit covered with snow, and probably 17,000 or 18,000 feet above the sea. It is called Ruwurzori, and will probably prove a rival to Kilimajaro. I am not sure that it may not prove to be the Gordon Bennett Mountain in Gambaragara; but there are two reasons for doubting it to be the same: first, it is a little too far west for the position of the latter as given by me in 1876; and, secondly, we saw no snow on the Gordon Bennett. I might mention a third, which is that the latter is a perfect cone, apparently, while the Ruwurzori is an oblong mount, nearly level on the summit, with two ridges extending north-east and south-west.'

In his letter to the Royal Geographical Society, dated September 1, 1888, from the Marriri Rapids, Ituri River, Mr. Stanley gives some additional particulars regarding his discovery of Ruwurzori on May 25, 1888. 'Half an hour after we' (*i.e.* Stanley and Emin) 'parted I was musing, as I walked, of the Pacha and his steamer, when my gun-bearer cried out, "See, sir, what a big mountain; it is covered with salt!" I gazed in the direction he pointed out, and there, sure enough—

> Some blue peaks in the distance rose,
> And white against the cold white sky
> Shone out their crowning snows—

or rather, to be true, a blue mountain of prodigious height and mass. This, then, said I, must be the Ruwenzori, which my natives said had something white, like the metal of my lamp, on the top. By prismatic compass-bearing the centre of the summit bore 215° magnetic, from the shores of [Albert] Nyanza. I should estimate its distance to be quite 50 miles from where we stood. Whether it is Mount Gordon Bennett or not I am uncertain. Against the supposition is the fact that I saw no snow on the latter in 1876, that its shape is vastly different, and that Ruwenzori is a little too far west for the position I gave for Gordon Bennett; and I doubt that Gordon Bennett Mountain, if its latitude is correct, could be seen from a distance of 80 geographical miles in an atmosphere not very remarkable for its clearness. I should say that the snow-line seemed to be about 1,000 feet from the summit. There is plenty of room for both Ruwenzori and Gordon Bennett in the intervening space between Beatrice Gulf and the Albert Nyanza.'

WINTER ASCENTS.—A great number of winter ascents have been reported, besides those mentioned in our last number (pp. 248–9). The two most important were made by Italian climbers. On January 21 the Grand Paradis was ascended by the usual easy way from the head of the Val Savaranche by a caravan of sixteen members

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of the Italian Alpine Club (among them Signori Vaccarone, Martelli, and Fiorio), with eleven guides and porters, all of the latter (with a single exception) hailing from Val Tournanche—twenty-seven persons in all. The ascent took seven hours from the Rifugio Vittorio Emmanuele II., and the weather seems to have been calm. (The peak had been already climbed in winter by Signor Vittorio Sella and Mr. Samuel Aitken, on March 2, 1885.) A month later (February 19) Signori Vittorio, Gaudenzio, Erminio, and Corradino Sella, with Daniel and Battista Maquignaz, of Val Tournanche, traversed Monte Rosa. The party left the Capanna Gnifetti at 3 A.M., crossed the Lysjoch, and gained the summit at 12.30 by way of the southern face, the rocks of which were somewhat iced. The sky was clear, but the cold not intense (— 16° C. = 3° F.). The descent to the Gorner Glacier by the usual route was not difficult, though a strong wind was rather troublesome on the ridge between the summit and Sattel; but there was so much snow on the glacier, and it was so soft that progress was greatly retarded, and the Riffelhaus was not gained till 4 A.M. With that exception the snow was throughout in excellent condition. We most heartily congratulate those gentlemen on their very remarkable exploit. On January 5, 1888, they traversed Mont Blanc, while on January 26, 1884, Signor V. Sella made the first winter ascent of Monte Rosa (up and down from the Gorner Glacier), having already traversed the Matterhorn on March 18, 1882. The name of Sella is thus associated with very nearly all the chief winter ascents that have been hitherto made. On March 4, 1889, Signori Dalgas and Poggi with four Italian guides ascended the Lyskamm by the S.W. spur; the weather was very fine and the cold on the summit only a degree greater (17°) than on Monte Rosa, but during the ascent the thermometer fell to 30° (= — 25½ Fahr.)! On March 25 Herren Fischer and Kniep, with two guides, ascended the Thurnerkamp in the Zillerthal, one night only being spent away from Vienna.

PROPOSED HUT ON THE BOSSES DU DROMADAIRE.—Monsieur J. Vallot, who, it will be remembered, spent three nights in 1887 on the summit of Mont Blanc, has formed the plan of erecting a hut on the highest rocks of the Bosses, at a height of about 4,450 mètres (= 14,453 feet). Monsieur Vallot intends to defray the cost of this refuge, eighty of the Chamonix guides having volunteered to carry up the materials for building, without requiring any remuneration. It is announced that the hut will be large enough for ten persons, and will contain beds, blankets, tables, cooking utensils, stove, petroleum for fuel, tea, coffee, &c. Every traveller passing the night there will be required to pay a small fee (probably 10 francs), which will be devoted to maintaining the cabin in proper repair. It will be interesting to see whether this hut will ever come nearer its destination than that proposed to be set up on the summit of the Jungfrau, which seems to have become a permanent summer-house annexed to the Eggischhorn hôtel.

TWO NEW MOUNTAIN INNS IN ITALY.—At the end of June next Signor Baglioni (proprietor of the Hôtel d'Angleterre at Turin) will open the Grand Hôtel at Ceresole Reale at the head of the Val d'Orco. This new house (see above, p. 290) contains one hundred rooms, is

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lighted by electricity, and is fitted in modern style throughout. It will greatly help to make Ceresole a place of resort for mountaineers, for its position to the south of the Grand Paradis group makes it the only rival to Cogne on the north side of that chain. The Albergo Alpino—Il Matanna—at Ferriere (Stazzema), in the Tuscan Apennines, will be transferred this spring to a new and larger building. It can be easily reached from the railway stations at Lucca or Pietrasanta, and would be a good head-quarters for any one desiring to explore the little-visited Apuan Alps.

Mountaineering Made Easy.—In the 'Bulletin du Club Alpin Français' for 1889 (No. 1, pp. 28–9, No. 2, p. 64) Monsieur Henri Duhamel has given an account of a new kind of condensed food—biscuits made of kola nuts, a fruit which is employed by the warriors of the Soudan to sustain their strength during long marches. These biscuits have been used by French soldiers with the most satisfactory results, which have also been attained in the case of climbers when the biscuits formed part of the ordinary provisions. In the latter case four should be eaten on rising, and three after lunch and dinner respectively. Their effect is said to be really marvellous, for it is stated that if they are regularly eaten every hour the walking powers of the consumer increase with the length of the next stage. They may be procured from M. Gaucher, 'biscuitier,' at Saint Barnabé, banlieue de Marseille, and cost 2 francs 50 centimes a kilo. (2 lbs.), packed and delivered at the Marseilles railway station. We hope that some of our readers will try these biscuits during the coming season and will communicate their experiences to us.

A Quick Ascent of the Meije.—Monsieur F. H. Dunod has communicated to us the following particulars of his ascent of the Meije on September 11, 1886, the time occupied being remarkably quick, though M. Dunod thinks that if the weather had been finer, and if the ascent had not been quite new to both his guides (François Simond of Chamonix and Emile Rey of Courmayeur), an hour could have been saved on the way up. Starting from the Châtelleret refuge, in the Vallon des Etançons, at 2.30 A.M., the party was delayed some time by bad weather, reaching the Pyramide Duhamel at 7.30 only. At 8.30 they were on the Glacier Carré, and at 9.30 on the summit. Leaving the top at 9.45, the lower edge of the Glacier Carré was gained at 11, the Pyramide at 1, and the Glacier des Etançons at 2. Thence mounting to the Brèche de la Meije they traversed the ridge of the pass at 3, and arrived at La Grave at 6.30 P.M., having taken 16 hours (including halts) from their starting-point. The extremely short times taken up from (2 hours) and down to ($3\frac{1}{4}$ hours) the Pyramide Duhamel—between which and the top the really difficult bits are encountered—are particularly noticeable.

The New Survey of the Eastern Alps.—The following list of the heights (in mètres) obtained for a number of peaks and passes in the Eastern Alps supplement those in our August (p. 61) and February (pp. 252–3) numbers. We are indebted for almost all of them to the kindness of Dr. Carl Diener, the President of the Austrian Alpine Club, a few being added from the very handy and complete list of all

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the published heights given in the new Austrian Survey, which appears on p. 68 of the 'Oesterreichische Touristen-Zeitung' for March 15, 1889 (No. 6 of 1889):—

—	New Survey	Old Survey
Stelvio Pass	2,760	2,757
Hochjoch	3,536	3,604
Rainerhorn	3,561	3,554
Schwarzwand	3,512	3,513
Dreiherrenspitze	3,505	3,499
Röthspitze	3,496	3,492
Ankogel	3,263	3,253
Gross Glockner	3,798	3,797
Hochgall	3,443	3,442
Schwarzenstein	3,370	3,367
Elferkofel	3,115	3,075
Zwölferkofel	3,091	3,085
Tofana di Mezzo	3,241	3,269
Sorapiss	3,201	3,310
Monte Cristallo	3,199	3,260
Piz Popena	3,143	3,231
Drei Zinnen	3,003	2,963
Monte Boé	3,152	3,164
Langkofel	3,178	3,179
Grohmannspitze	3,010	3,174
Kesselkogel (Rosengarten)	3,002	2,982
Cima d'Asta	2,848	2,844
Similaun	3,607	3,599
Paralba	2,695	2,691
Zuckerhütl	3,517	3,500
Zugspitze	2,968	2,960

Thus in the Ampezzo Dolomites the order now is Antelao (3,255), Tofana (3,241), Sorapiss (3,201), and Monte Cristallo (3,199). The Cristallo and Popena have been found to be much lower than is generally assumed, and are the chief victims in this list. The relative positions of the Elferkofel and Zwölferkofel have been reversed.

It may be added that, according to the new Italian map, the Adamello attains 3,548 (formerly 3,547) and the Antelao 3,255 (formerly 3,320) mètres. The new heights of the Civetta (3,177) and of the Pelmo (3,168) do not seem to be yet known.

Alpine Accidents.—We are sincerely glad to be able to announce that the fatal accident which was reported to have taken place last summer on the Cimon della Pala never happened at all, the story, together with all the painful details reproduced in our November number (p. 138) from the 'Standard,' having been invented by one of the minor Vienna newspapers. The 'Mittheilungen' of the German and Austrian Alpine Club* announce that the murderers of Dr. Schieck† have been discovered, tried at Botzen, convicted, and sentenced to death. They were two Tyrolese shepherds from the Vintschgau, Jakob Kuen and Josef Schöpf by name, and throughout denied their guilt. It was

* April 15, 1889, p. 90.

† See the November number of the *Alpine Journal*, p. 141.

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proved at the trial by the evidence of the surgeons who examined the body that the wounds in the unfortunate gentleman's head could not have been caused by his fall, but must have been inflicted before by a blunt weapon of some sort; that the two accused men had spoken to Dr. Schieck on October 11, when he asked his way of them; that the nature of the ground above the precipice at the foot of which the body was found is of such a nature as to make it practically impossible that a slip could have led to a fall; and, finally, that in the possession of the accused were found several objects belonging to Dr. Schieck, in particular his gold watch, which was sent to Mals to be mended and led to the arrest of the accused. The defence was mainly that death was due to an accidental fall, and that the objects in question were taken by the two shepherds from the body of Dr. Schieck when they found it some time after the accident. The accused, however, contradicted each other repeatedly at the trial, and one of them had previously been convicted of several offences. The jury were unanimous in finding a verdict of guilty. The whole of the judicial proceedings are in striking contrast with those in the case of the murder, in 1863, of Herr Guensell on the Col de Torrent.* It is satisfactory to call to mind that, despite many opportunities, deliberate attacks on solitary travellers are of extremely rare occurrence—in fact, at this minute we cannot remember any other besides these two, for that recorded in the 'Alpine Journal,' vol. xii. p. 184, was apparently the act of a madman.

We regret to say that on March 25 Herr Robert Kanitz lost his life while descending, in the company of Herr Zilger and the guide Wurozel, from the Raxalpe (near Vienna) by the Losbühel-Steig (Teufelsbad Stube). It was due to a slip while traversing a snow-filled gully, Herr Kanitz having persistently declined to attach himself to the rope with which the two other members of the party were tied together.

Picture Exhibitions.—The usual exhibition of Alpine pictures on the day of the Winter Dinner not having been held in 1888, there have been, in February, March, and April, at and for a few days after the ordinary monthly meetings, exhibitions of the works of individual artists.

The February exhibition was confined to pictures and sketches by Mr. E. T. Compton, who showed nearly 100 examples of his skill in oil and water-colours. Mr. Compton possesses several qualifications which are wanting to many Alpine artists. Without the imaginative mystery or the subtle delicacy of a Collingwood or a Hunt, he yet contrives, by broad and faithful rendering of well-chosen subjects, to prove to any but very unsympathetic persons that the Alps are both paintable and beautiful. His distances and middle distances are good, and the 'tone' of most of his work is so true that he often comes near to catching those uncatchable qualities of light in atmosphere and on snow surface which make up much of the charm of mountain scenery. Mr. Compton does not turn his attention much to figures (the absence of which sometimes injures his landscapes), but we were glad to see some sketches of climbing adventures, and we hope that

* *Alpine Journal*, vol. i. pp. 138, 207.

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more artists will give us illustrations of this kind of subject, which is capable of infinite variety of treatment. Another merit in the collection was the diversity of the examples, including, as they did, views in Switzerland, the Tyrol, the English Lakes, Italy, Norway, and Corsica. Members will be glad to hear that Mr. Compton has presented to the Club the very characteristic Norwegian landscape (No. 5) called in the catalogue 'Svartisen, Norway.' This was one of the best sketches in the exhibition.

Space does not permit of a long notice of the pictures, but a few may be specially mentioned. No. 48, a large water-colour of a waterfall in Valdersdal, Norway, with a lurid evening sky, a composition full of imagination, was a satisfactory treatment of one of a class of which there were not many specimens. The water, in particular, was well painted. More representative samples of the subjects in which Mr. Compton generally delights were:—The Matterhorn (oil) (No. 20), the Stellisee and cattle in the foreground, daringly bright in colour and in tone, but not untruthful; Monte Rosa from the Pizzo Bianco (water-colour) (No. 29), remarkable for the way in which the glacier in the foreground was so painted as to be evidently flowing down-hill, straight away from the spectator and up the paper—always a difficult matter to accomplish; two charming little water-colours of the Matterhorn (Nos. 38 and 40), more subdued and mellow in colour, the hot haze in the air carefully rendered; the Gross Glockner from the Pragerhütte (No. 46), a slight, vigorous water-colour, the aerial perspective of a clear evening sky well given; a small sepia sketch and a larger oil painting of the Jungfrau from the Little Scheidegg (Nos. 54 and 66), the latter not so successful as the former, which was very delicate in the snow and cloud work. Lastly, a rough oil sketch (No. 65) seemed to us to be hung too high for seeing and for its deserts. It appeared to be a vivid Loppé-like record of the effect of sunset light upon rock and snow.

The March exhibition consisted entirely of works by Mr. Alfred Williams. The odour of comparisons should, as a rule, be absent from these pages, but a contrast is scarcely a comparison, and the Club may be glad to possess among its members two artists whose gifts differ so widely as do those of Mr. Compton and Mr. Williams. Mr. Williams does not seek to give us broad effects, or intensity of colour, or depths of light and shade, in the same way as does Mr. Compton; but he is acute in his observation of mountain form: his main shapes have character, and from any of his painstaking studies of any particular peak or range an expedition could be planned with nearly as great certainty as from an inspection of the scene on the spot. His strength, if the criticism may be permitted, is his weakness, and his care to give details in his pictures may by some be thought to interfere with their fidelity regarded as a whole.

Mr. Williams' work is essentially that of a mountaineer, and affords ample proof of many days' patient and loving study amongst the eternal snows. Faithful as he is in the rendering of the outline of bold rock-peaks, such as the Aiguille des Charmoz (No. 26), it seems to us that it is in snow and ice scenery that he finds his chief delight. No. 44, the Silberhorn, was a most poetical conception of that lovely peak half veiled

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in floating mists; and No. 13, the Saas Grat from the Augstbord Pass, was not only interesting to the student of mountain forms, but a beautiful picture, giving a good idea of the great height of the range. No. 17, a glacier pool; No. 29, deep snow near the summit of the old Weissthor; No. 32, a Loppé-like representation of blue ice; and particularly No. 10, the ice-fall on the Gorner Glacier, most carefully drawn, and a delicate representation of sunlight playing on the intricate network of crevasses —must all convey some sense of the beauty of the ice world even to persons unacquainted with the Alps. In valley scenery Mr. Williams is hardly so happy; yet No. 3, the Lyskamm from Gressonay, was an impressive picture; a light mist ascending from the valley, and the mountain itself—not very beautiful in form—made interesting by the light of the rising sun on the upper snowfields. Again, No. 41, the Signal Kuppe from Alagna, realised more than some Alpine paintings do the boldness and the grandeur of a great peak.

The April exhibition consisted of contributions by Mrs. Gibson (perhaps better known as Miss Paine), Mr. Barnard, Mr. Donne, and Mr. Willink, and naturally displayed a great variety of styles.

Mrs. Gibson contributed nine water-colour sketches, accurate and painstaking representations of well-known scenes in the Oberland and Zermatt districts, the most interesting of which perhaps was a view of the range from the Rothhorn to the Dent Blanche, taken from the Zinal side, with the Matterhorn just appearing over the Col Durand.

Mr. Barnard sent eleven pictures, all painted in his familiar painstaking manner. The most effective was a large view of the Matterhorn from below the Riffel, lent by Miss Springfield—an elaborate composition, free from the great fault of exaggeration as to the steepness of the outline of the peak. Those who do not know how long Mr. Barnard has been painting mountains will be surprised to hear that the picture of Loch Coruisk, lent by Mr. Crookes, has just been executed at the age of 82.

Mr. Donne's work is equally well known. The twenty-nine examples which he sent were fair specimens of his broad and telling treatment, especially a number of little sketches at San Martino, Saas Fee, &c. There are few artists who can with so little effort make so bright and solid a picture out of a group of chalets on a hillside, sometimes without showing any sky-line, or even rocks or glacier, but just the foot of the green slopes behind. His two larger works were hardly carried far enough to enable an opinion to be formed upon them, but in one of them ('Crossing the Toblinger Pass') there was a simplicity and a feeling of size which promised a great deal. We understand that some of Mr. Donne's best recent work had unluckily been disposed of just before the opening of the exhibition. Mr. Donne has kindly presented two of his drawings to the Club.

We were glad to see that Mr. Willink did not confine his contributions to Alpine drawings only (a set of photographs of which has been issued in a collected form by Mr. Spooner, 379 Strand), but showed a great variety of subjects, with all of which he knows how to deal effectively. The original drawing of the invitation form used for the private view at the recent exhibition of Mr. Donkin's photo-

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graphs deserves special mention, and is a work of which he may well be proud. Most members of the Club will agree that it gives us the most satisfactory portrait of Mr. Donkin that we possess, and it is therefore reproduced in the present number (p. 309). Among the best of Mr. Willink's works were two copies of the Turner water-colours in the National Gallery, 'Totnes' and 'Arundel.' Other works of a similar kind are as original and full of humour as are his three mountaineering sketches entitled the 'Use of the Rope.' In his 'Druids at Work'* a rather sensational piece of mountaineering is illustrated with remarkable power, and Mr. Willink shows again how well he can treat the human figure in vigorous action. His drawings of English scenery (amongst which we must mention 'The Screes, Wastwater,' a picture reminding us of another of our artist members, Mr. Colin Phillip, and some particularly good sunset studies from the Cumberland coast) have all the same characteristics as most of his Alpine work. There is a directness and absence of labour in it—if we may say so, a certain breath of fresh air—which make us realise without any effort what the artist saw and felt; and Mr. Willink has the happy gift of conveying vividly to our minds the impressions and the influences under which his work is produced.

REVIEWS AND NOTICES.

Zeitschrift des Deutschen und Oesterreichischen Alpenvereins, vol. xix., 1888. (Munich.)

THE contents of this periodical seem every year to be more and more devoted to scientific subjects, history, &c., connected with the Alps. Mountaineering expeditions are quite the exception and seem now to be generally relegated to the 'Mittheilungen.' Geology, glaciers, and kindred subjects occupy nearly half the volume. Dr. M. Neumayr contributes an article on 'The Formation of Mountain Masses and Chains'; Herr F. Löwl on the 'Lüner See'; Dr. Ed. Richter, an additional chapter on the 'Glaciers of the Eastern Alps,' including the Karlinger and the Obersulzbach glaciers; Dr. S. Finsterwalder on the 'Glieder Ferner'; the same with Dr. H. Schunck on the 'Gepatsch Ferner'; Herr F. Seeland, an additional chapter (ix.) on the 'Pasterze Glacier'; Herr A. Rothpletz on the geological formation of the 'Karwendel Gebirge.' Agriculture, past and present, and rural economy are also largely represented. Herr H. Peetz has two articles on 'Farming in East Bavaria,' from Roman times downwards; Herr F. Schindler on 'Agriculture in the Hohe Tauern'; Dr. Max Hoefler on 'A Boundary Dispute between Alp Owners in Tirol and Tölz, 1620–1638.'

In process of time even in remote regions of the Alps modern habits come in and old ones disappear. Efforts to preserve at least the memory of the latter from perishing appear in various articles, such as the 'Burggräfler,' by Herr K. Wolf, giving an account of the lives and

* See Mr. Dent's *Above the Snow Line*, pp. 210–213.

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habits of the peasants near Meran; by Herr A. v. der Passer on 'Marriage Customs in the Eisack Thal'; by Herr Johann Krainz on 'Marriage Customs in Styria'; by Herr K. A. Reiser on 'Legends in Allgau'; a monograph by Dr. G. Alton on the 'Grödenthal,' its history, people, legends, &c.

We have also from Herr A. Wessinger an article on the 'Nomenclature of the Lower Innthal'; and from Herr K. Gruber one on 'Marterl and Taferl,' those records of death and misfortune which meet us at almost every turn in the Alps. A very curious use of the 'Todtenbretter' (the boards on which the coffins are placed and on which the names of the deceased are carved) is seen at Lermoos, where they are laid across the marshes and serve at once to save the traveller's life and to remind him of its uncertainty. Dr. Starke gives us a philosophical essay on 'The Eye for Nature in the Alpine World'; and Herr H. Reinstein an introductory essay, with some useful hints, on 'Sketching in the Alps.'

The remaining articles are more strictly connected with mountaineering. Dr. Frischauf writes on 'Arbe and Velebit,' the former being the northernmost island on the Dalmatian coast, and the latter the mountain mass on the mainland opposite. Herr Anton Spiehler gives us a concluding chapter on the 'Alps of the Lechthal.' The whole series of these chapters may well form a mountaineer's guide to the district. The Memmingen section of the D. und Ö. A. V., besides erecting the commodious hut in the Parseyer Thal, have made many new paths and have marked routes in all directions.* Professor Kuhn has a pleasant article on the district of the Alpstein in Canton Appenzell (of which the Sentis is the highest point), with the ascents of some well-known and other little-known peaks in that district. Herr C. W. Pfeiffer describes the ascent of the Braunorgl Spitze in the Bregenzer Wald. Professor K. Schulz gives a summary of the peaks in the Dolomite group of the Geisler Spitzen in the Grödenthal, with a notice of their first ascents. The peaks fall much more steeply towards Villnöss than Gröden, and the ascents are without exception made from the latter valley. The most rugged and difficult part of the group lies towards the west, and is called the 'Fermeda Spitzen.' It is divided from the rest of the group by the Mittagsscharte. The most easterly point, the Mittagsspitze, was ascended by the guide J. B. Vinatzer alone in August 1884. The western summit was attained on October 3 of the same year by the well-known mountaineer Herr Johann Santner, of Botzen, likewise alone. The summit next to this, called Fermeda Thurm (2,867 mètres = 9,406 feet), the highest of the group, was attempted on July 30, 1886, by Herren Schulz and Purtscheller, with the guides

* The marking of mountain paths in the German Alps is very common, but it has here been carried to an extravagant extent. The tourist must feel that he is never out of leading strings. The system is all very well now and then, but adopted as it is to the present extent, the tourist has seldom the satisfaction of finding the way for himself. There is, however, a retribution even in this. Tourists have been known, where the way divided, to follow the wrong 'Markirung' for several hours before discovering their error.

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Franz Fistil and J. B. Vinatzer. The two latter went rather as companions than guides. They ascended to the notch between the second and third peaks, but could find no way to the summit, and were obliged to return. Herr Purtscheller declared the peak to be absolutely inaccessible; but Herr Schulz, remembering certain grassy ravines on the south side of the peak, was of a different opinion. On August 4, 1887, Professor Schulz, Herr F. G. Martin, of Munich, and Mr. E. T. Compton, with the Primiero guide Michele Bettega, effected the ascent by the more easterly of the above-mentioned ravines. Amongst many difficulties, the chief was the passage of a steep wall of 'Platten,' up which Bettega made his way with masterly skill and activity. The ascent from the Cisles Alp took three hours and ten minutes. The Villnöss Thurm is yet unascended, but Herr Schulz thinks that it may be attained from the notch between it and the Fermeda Thurm. The Club hut on the Cisles Alp, which was opened by the Section Regensburg, August 26, 1888, greatly facilitates the excursions in this group. On this day no less than eight members of the Regensburg section, with a number of guides, made the ascent of the Sass Rigais (3,182 mètres = 10,440 feet), the highest peak of the entire group. A photograph by Obernetter, from a drawing by Mr. E. T. Compton, shows nearly all the summits in this picturesque group.

Attached to the volume are plans of the Karlinger, the Glieder, and the Gepatsch Ferner, a number of mountain views, chiefly in the Karwendel district, and a panorama from the Hohen Rad (2,912 mètres = 9,554 feet) in the Silvretta district, by Herren T. Immler and J. von Siegl, with a notice by Dr. J. Frischauf. The map of the Karwendel Alps, announced with this volume, will not be delivered until next year. J. S.

Die Wildbach- und Fluss-Verbauung nach der Gesetzen der Natur. Von A. Schindler. (Zurich: Hofer und Burger, 1888. Large 8vo. pp. 81. 4 francs.)

In this book the author takes an entirely new departure, and sets forth a new method of remedying the evils occasioned by the outbreaks of mountain torrents. The true form of the earth's surface being convex, all changes to a concave shape produced by the action of water or other influences are, so to say, an unhealthy condition. Such are the watercourses with their hollows and ravines. Everything in these, whether water or rubbish, is carried along by the force of gravity to reach, as nearly as it can, the centre of attraction. Wherever the surface is less inclined, the speed of the water and its carrying power is diminished, the rubbish is deposited in conical piles, whilst the stream is itself divided into many channels over the conical surface. Nature here is trying to cure the evil, to fill up the channel and approximate by degrees to the healthy convex form. But nature is unable absolutely to effect this herself. The rubbish may accumulate for a time, but, unless fixed by artificial means, it will be carried away by the next flood, and bring destruction to regions below. The surface of the cones ought to be fixed and the stream made to divide itself over the surface. Hitherto the practice followed has been exactly opposite to this. A channel is usually cut along the cone to enable the water and

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any rubbish brought down by it to make its way as quickly as possible; and it has been regarded as highly dangerous to fill up the bed of the stream, although only in this way can a healthy convex form be approximately obtained. The filling-in process must of course begin from above. The smallest cracks must be filled up and secured, for these are the beginning of the evil. The larger channels must be dealt with gradually, and by successive operations. The method of dealing with the main channels has hitherto been almost exclusively by building transverse walls (Thalsperren) across them. The author rejects these entirely, except where a foundation absolutely solid is to be had. In fact, he generally decries the use of masonry, and points out that in certain great floods (notably that of the Vorder Rhein in 1868) the strongest works were those which were most completely destroyed. In the same flood in the Val Fassa, the massive wall erected at S. Giorgio at a cost of upwards of 20,000*l*., the foundations of which reached a depth of 26 feet, was completely destroyed by the Avisio because it was built on no solid foundation. The weapon on which the author relies almost universally is the wooden pile, from the stick a couple of feet long to the beam twelve or fourteen feet long and a foot square. These are driven into the hollows to be filled up, projecting more or less (as required) above the level of the surface. The intervals are to be filled in with suitable stones, and nature will by degrees restore the surface. The process may have to be repeated several times before the required level is reached. In the bed of the stream, where it is more rapid, the piles must be in sets of four or five rows, the lowest being driven in up to the head, whilst the others project. Each of these sets would soon form a boss, over which the water would rise, and then divide itself on either side. The author illustrates his method by the case of a ravine near Glarus. This was at first treated with 'Thalsperren,' but these were continually eaten away, and had to be renewed. It was subsequently treated by the author's method, and so successfully that after two years had elapsed the place was so overgrown that its situation could hardly be found. Of course, as he admits, there are cases where even this system may fail, as in the case of the Nolla (Hinter Rhein), which seems to draw its supplies from reservoirs of rubbish of unknown depth. Yet even here he maintains that his system would give, if not absolute immunity, at least greater protection from future damage than any other. Only in the case where the stream has cut a chasm in rock having a solid foundation, would he fill up the channel with masonry. The merits of the pile are that it is easily obtained, inexpensive, and almost unassailable. Having made the course of the stream to its junction with the main valley as convex as possible, he would now adopt the opposite plan, and instead of seeking to divide it would speed it on as rapidly as possible. The course of the river must be made straight, the section of the bed must be a flattish oval, with gently sloping banks so as to diminish the whirlpools which would otherwise be mischievous. If no lake presents itself, the bed must be widened here and there at suitable places to allow for the deposit of rubbish which may be brought down.

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A number of plates, some showing the actual condition of certain mountain torrents, and others their mode of treatment upon the new principle propounded by the author, complete this interesting work.

J. S.

Taschenflora des Alpen-Wanderers. Von Ludwig Schröter. (Zürich: Meyer & Zeller, 1889. 5 marks.)

That the above book should have been presented to the Alpine Club is a sorry, but I am afraid a just, testimony to the botanical knowledge of its members. In 115 chromolithographs of Alpine plants Dr. Schröter proposes to teach in an elementary and easy manner sufficient botany to enable the mountaineer to name the plants he meets with in his climbs. But in this we cannot think he has succeeded. Chromolithography, as the author apologises, does not admit of treatment delicate enough fairly to represent flowers, or even leaves, especially when they are small; and as to stamens or pistils, they are not even attempted; moreover in the meagre text description these not unimportant parts are barely mentioned. Though the vertical range of the different plants is fairly given, there is no attempt to assign the geographical distribution. If the aim of the book be merely to enable the non-botanical traveller to put names to the flowers he sees, those caring to do so will probably be able to progress thus far in botany with the help of some friend or guide with less chance of error; for, to say the truth, some of the coloured plates are only to be recognised by one well acquainted with the aspect of the live plant. The difficulty is increased by the plants being unavoidably drawn on a widely different scale, though placed side by side. For instance, on table xi. the *Lloydia serotina* would at first sight appear a larger and more robust plant than the *Anemone narcissiflora*, drawn below it.

There has been lately a plethora of illustrated Alpine flora, but pictures, even at the best, are a very indifferent way of studying botany. It is very much like learning the classics with a crib. Perhaps the best of these coloured representations, though *longo intervallo* after Reichenbach, is V. dalla Torre's Atlas; but to our mind as a pocket name-finder for the uninitiated none of them are equal to the four little volumes of 'Alpen-Pflanzen,' by Weber. Illustrated works, especially in colours, must, however, be expensive, and Dr. Schröter has certainly given as much as any one has a right to expect for 5 marks, and deserves credit for having come forward to enunciate once more that there are charms on the mountains unconnected with the difficulty of the climb.

C. Packe.

Guida delle Alpi Occidentali. Da A. E. Martelli e L. Vaccarone. Vol. i. Marittime e Cozie. (Turin, 1889. Pp. lxxiv, 430, small 8vo. 5 francs.)

Some years ago Signori Martelli and Vaccarone published (under the auspices of the Turin section of the Italian Alpine Club) a guide to the Piedmontese Alps, which was received with great favour * and has rendered enormous services to all explorers of that portion of the

* *Alpine Journal*, vol. x. pp. 170–172.

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Alpine chain. Encouraged by their success, they have prepared a new edition of the book, in a very much improved and enlarged shape. The original work took in the Alpine chain from the Col de l'Argentière or de Larche (between the Stura and Ubaye valleys) to the Levanna *massif* (between the Arc and Orco valleys). The new edition, however, is to describe a far wider tract of country, for it starts at the Col de Tenda and is to include all the Piedmontese Alps right round to the Simplon and the Gries. The first volume only is as yet published. It takes in the Maritime and the Cottian Alps—that is, the main chain from the Col de Tenda to the Mont Cenis—but if the rest of the range as far as the Gries (including the Grand Paradis district) is to be described otherwise than very superficially I venture to think that at least *two* more volumes will be required in place of the single additional one contemplated by the authors.

A great part of this first volume is a reproduction of the corresponding bits of the original edition, but has been most carefully revised and brought up to date. The most extensive additions occur at the beginning and at the end. In the one case we have for the first time a detailed and accurate account of the higher peaks and passes of the Maritime Alps, in the other a full description of the very tangled and little-known ranges around Césanne. In both I can say most emphatically, from a tolerably minute acquaintance with these districts, that the guide is remarkably accurate and remarkably complete. The matter is arranged in the following fashion. The traveller is supposed to start successively from one or other of the small towns in Piedmont at the entrance to the main valleys—Cuneo, Saluzzo, Pinerolo, and Susa. The main valley is described; then come the itineraries of the passes connecting it with the neighbouring glens, while the accounts of the peaks are grouped together at the end of each section. Three very clear large-scale maps (which, however, very unfortunately are just *not* continuous) are a great advance on the sketchy general map of the first edition.

In the introduction also many improvements and additions have been made. The glossary of Alpine words has swelled into a small dictionary; there is an extremely full (though not quite exhaustive) bibliography of the literature relating to the Maritime and Cottian Alps, and a very useful alphabetically arranged table giving the heights of the principal peaks and passes, with the names of those, whether travellers or guides, who have made the first ascent or passage of each, as well as the dates of the expeditions and the route followed in each case. My only regret as to this extremely valuable table is that the Maritime and Cottian Alps are not placed in separate sections and that the peaks and passes are not arranged according to height rather than alphabetical order, for the excellent index at the end would obviate any inconvenience arising from the adoption of the former course. Dr. Vallino's advice on various Alpine matters is reprinted from the original edition, but I am not sorry that the odd illustrations and the rather useless topographical descriptions prefixed to each section have now been omitted, while the historical section has doubtless been dropped owing to the enlargement of the scheme of the work.

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The book is thus far in advance of the first edition. It has been thoroughly revised, and greatly enlarged, so that it will be absolutely indispensable to anyone henceforth visiting the Piedmontese Alps.

These last words indicate what to my mind is its great defect—due, I fear, to deliberate intention rather than to accident. This is, that it describes one slope only of the Alpine chain. Save in the table of first ascents we hear nothing of the peaks which are not either on the frontier ridge or entirely in Italy, while the descriptions of the passes become vague and indefinite as soon as the political boundary is passed, a course which affords a violent and very unfavourable contrast to the minute description of the Italian half. For the French side one is thus forced to have recourse to other sources (there exists as yet no single guide-book dealing with it), and this is a distinct drawback for all climbers—even Italian climbers, who cross over to that side. Hence the book has an imperfect look about it when compared with Mr. Ball's 'Alpine Guide,' in which no account is taken of political boundaries. The authors are, I am glad to say, now and then inconsistent. For instance, they describe the Col de Gondran and the ascent of the Rochebrune, though both are wholly within French territory. On the other hand they very inconveniently exclude summits which lie on short spurs, stretching out from the main chain on the French side, such as the Aiguille de Chambeyron,* Tête du Pelvat,† and the Pointe de Solliette.‡ True these peaks are wholly French, but they are so close to the frontier that it would have involved very little trouble to put in notices of them, which would at least render the description of the main chain and its immediate spurs or buttresses absolutely complete. There are also some peaks and passes descriptions of which have been accidentally omitted in the book—*e.g.* Punta Gastaldi,§ Roccie Fourioun, Monte di Marte, Colle Isaia, and Passo delle Forciolline,‖ as well as all the peaks (save the Albergian) on the ridge between the upper part of the Germanasca and the lower part of the Chisone valleys. Then too the easy and obvious ascent of the Punta Ferrant from the Col d'Ambin ¶ is not noted, though the longer route from the east is described, while my original account of the ascent of the Rognosa d'Etiache from the Colle Sommeiller is repeated,** no notice being taken of my later correction that the lower peak only was reached by my party on that occasion.†† The authors, too, do not seem to realise that the point near the Grand Rubren or Rioburent, marked 3,396 mètres on the French map, but having no name assigned to it there,‡‡ is identical with the 'M. Salza,' 3,326 mètres, of the new Italian map. The description of the routes up the Viso is very inconveniently given in two bits, twenty-four pages distant from one another, while it would be as well to strike out the lengthy account of the

* *Alpine Journal*, vol. ix. pp. 349–350; vol. x. p. 131; *Annuaire du Club Alpin Français*, 1883, pp. 23–31.
† *Alpine Journal*, vol. x. pp. 349–350.
‡ *Ibid.* vol. xii. p. 117.
§ *Ibid.* vol. xii. pp. 110–111.
‖ *Ibid.* vol. xiv. p. 143; *Annuaire du C.A.F.*, 1877, p. 586.
¶ *Alpine Journal*, vol. vi. p. 292; vol. xi. p. 336, *n.* 7.
** *Ibid.* vol. xi. pp. 350–351.
†† *Ibid.* vol. xii. pp. 409–410.
‡‡ *Ibid.* vol. ix. p. 349; vol. x. p. 130.

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attempts on that peak from the N.W., and to fill up the space thus obtained with a far more detailed notice than is given of the actual ascent by that route, which has now been achieved three times at least. In the bibliography Mr. Budden is made responsible for a description of the inns in the Maritime and Cottian Alps which he very kindly translated from my notes printed ten years ago in these pages,* while M. Cérésole's 'Légendes Vaudoises' relates to Vaud, in Switzerland, and not to the Waldensians.

These minute criticisms show how very complete and full the book is on the whole. I know well how extremely difficult it is to secure accuracy and completeness in writing or printing a guide-book; and hence I wish to offer my warmest thanks to Signori Martelli and Vaccarone not only for their admirable and clear descriptions, but also for the extremely accurate manner in which their work has been printed. I feel all the more at liberty to congratulate them since, with the single exception of the table of first ascents, I saw no portion of the work before publication, nor was I in any way consulted during its progress. My opinion is thus an impartial one, while it is based on a pretty thorough knowledge of all the districts described in the present volume. The book may be had in paper covers, or strongly bound in a substantial cover with pencil attached. The second volume will be even more generally interesting than the first, and will be awaited with great impatience.

W. A. B. Coolidge.

Guida Storico-Descrittiva e Itineraria dell' Ossola e sue adiacenze. Da G. G. Bazzetta e F. Brusoni. (Domo d' Ossola, 1888. Pp. 350, 12mo. 3 francs.)

This is one of the numerous local handbooks which have been and are being issued under the auspices of the various sections of the Italian Alpine Club, and the Domo d'Ossola section has been very lucky in selecting two such well-qualified writers as Captain Bazzetta and Professor Brusoni. We have here a description of the Val d'Ossola as well as of all its glens—that is, practically, of the valley of the Tosa and its affluents. As a sort of after-thought the Locarno valleys—Valle Maggia and Val Bavona—have been included. The preliminary matter includes an excellent historical sketch of the district by Father De-Vitt, as well as many details as to its geology, botany, and fauna, while the town of Domo d'Ossola is the subject of an elaborate monograph. Particularly worthy of commendation is the list of the sheets of the Sardinian, Italian, and Swiss surveys, which take in this region. The body of the work is made up of seventeen routes, which are admirably chosen. The very careful account of the ridges enclosing the Val Anzasca will probably be useful to the majority of those who will use this book. But, from the mountaineers' point of view, that on the Antrona valley, so little known to most of our members, is even more valuable. The real value of the book, however, lies in the extremely detailed and most accurate description of all the peaks and passes which rise round the upper part of the Tosa

* *Alpine Journal*, vol. ix. pp. 497–500.

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valley, *i.e.* the range from the Simplon to the Gries and the Basodino. This district is very little frequented by foreigners, but has been most thoroughly worked out by Signor Brusoni, who, we understand, is mainly responsible for the Alpine portions of the work. Those to whom the Veglia Alp, the Devero Alp, and the Basodino have hitherto been but names have now no excuse for not getting rid of their ignorance. It is true that the peaks are not of any very great height (Monte Leone is their monarch), but their position opposite the Oberland range makes them each and all natural and splendid view-points. The numerous passes enable anyone to make a pleasant détour, so as to avoid the upper valley of the Rhone, and the fact that German is still spoken by thoroughly Italian-looking people cannot fail to interest the historian and philologist. The good inn at Tosa Falls and the little mountain inns at the Alps of Veglia and Devero are the best head-quarters on the Italian side, while those at Bérisal, Binn, and Ulrichen are the most convenient halting-places on the Swiss side. It is rather a pity that the book deals only with the Italian side of the chain, as there is no full account as yet published of its Swiss side. A small sketch map (of not much higher pretensions than a key map to the routes), elaborate tables of the heights of peaks, passes, villages, lakes, as well as of the population of the various parishes, and the tariff for guides and porters on all the different excursions enumerated (even the Grenz Sattel as a pass from Macugnaga to Zermatt being included! though not the Silber Sattel) complete this very handy little book. It is one of the most favourable specimens of its class that have come under our notice, and deals with a district which is largely Alpine, and so of more interest to climbers than the sub-Alpine regions treated of in many similar works.

Excursions Géologiques dans les Vallées Limitrophes de l'Ubaye et de la Durance et sur la Frontière Italienne. Par David Martin. (Gap: Jouglard, 1888, pp. 111, 8vo.)

In this pleasant series of articles, reprinted from one of the Dauphiné newspapers, M. Martin, who is, we believe, a professor at the Lycée of Gap, and has for very many years wandered through the hilly districts around his home, gives us an account of a week's ramble in the August of 1887. His booklet describes the tangled and little-known ridges which enclose the upper course of the Ubaye in the Department of the Basses Alpes, on the one hand those dividing it from Italy, on the other those separating it from the valley of the Durance. No high ascents are chronicled, but besides the geological information imparted many of the lower passes are minutely described, such as the Col de Vars, the Col de Larche or de l'Argentière (one of the lowest of the great Alpine passes), the Col de Mirandol, the Col Longet, the Col Blanchet, and the Col de Fromage. Very little indeed has been published on these regions, and hence any additional information, especially if based on personal experience, is most acceptable. There is a full description of the hamlet of Maljasset, or Maurin, which will be the Zermatt of the district some day; but the unexpected luxury which M. Martin found there (contrary to the experience of the few other travellers who have

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visited the place) is probably the reason why the accommodation at the unlucky village of Ceillac (burnt to the ground on the night of February 23–4, 1889) is so unfavourably mentioned. M. Martin tells us that the real name of the peak, hitherto known by the vague appellation of Pic Signalé (3,236 mètres),* is Aiguille de l'Alpe de Jean Rostan—a much more imposing designation. We trust that M. Martin will give us a further instalment of his recollections of these unfrequented regions.

Ascensions et Flâneries. Par Eugène Rambert.
(Lausanne: F. Rouge, 1888. 3 vols. 3 francs 50 centimes each.)

Monsieur E. Rambert was a well-known Swiss climber and writer who died in 1886, after having been President of the Swiss Alpine Club from 1882 to 1884. He had collected his Alpine papers in five volumes, published under the general title of 'Les Alpes Suisses' between 1866 and 1875. He had intended to recast this work, but death prevented him from carrying out this plan. His friends and relatives have determined to issue a new edition of the work, rearranging the papers and adding many scattered ones written later. The first two volumes of the set contain the articles and sketches relating to mountaineering proper. The Dent du Midi is very conspicuous, as might be expected, and there are a number of other sketches from the hills of Vaud, the Linththal, the Valais, Uri, and the S. Gotthard district. The first paper of all, 'Les Plaisirs d'un Grimpeur,' is very pleasantly written and treats of a theme of which our readers ought never to weary. A description of the ascent of the Bristenstock recalls Mr. Hardy's famous excursion up and paper on that peak. M. Rambert's articles on natural history make up vol. iii. Two of these—on the Alpine flora and the origin of the Swiss flora—nearly fill the entire volume, the two remaining papers—on the Föhn wind, and the Glacier Theory—being much less elaborate. Vol. iv. will contain those on the general history of Switzerland, and vol. v. some Alpine reviews and tales. M. Rambert does not describe any very great or difficult ascents, but his observations are always worth reading, and his style is flowing; while he has the inestimable advantage of knowing and loving Switzerland as a whole and not merely as the site of a number of greased poles.

Das malerische und romantische Emmenthal. Von E. A. Türler.
(Burgdorf, 1887. 2 francs 50 centimes.)

This work deals with the pastoral region which lies behind Interlaken, and is touched by the direct line from Bern to Lucerne. The Emmenthal is a centre of Swiss country life and pleasures, of fine old peasants' houses, cheese-making, beer-brewing, singing, and wrestling. It abounds moreover, apparently, in pensions and bath-houses, and some of the British spinsters who spend their years in the pursuit of nature and living at few francs a day might do worse than try them. It has a Rigi of its own, the Napf (4,621 feet), which is 'noch nicht ver-

* See *Alpine Journal*, vol. x. p. 348.

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engländert,' and many other pleasant pastoral heights and dales. They are not likely to attract Alpine travellers at midsummer, but in late spring the flowers and orchards no doubt deserve all the praises which the Bernese author bestows on them, and would well repay a visit from wanderers who like to escape in bye-ways all the cosmopolitan incidents of the regular round of Swiss travel. D. W. F.

Das Frutigland. Von Karl Stettler. (Bern: Huber, 1887. 6 francs.)

Herr Stettler, the pastor of Frutigen, has in this very interesting book compiled a painstaking account under every aspect of the Bernese district known as the Frutigland. This district, which has belonged to Bern since 1400, has at present a population of 11,000 souls, and takes in the five parishes of Aeschi, Reichenbach, Frutigen, Kandergrund, and Adelboden, stretching from the shores of the lake of Thun to the Gspaltenhorn and the Balmhorn. Herr Stettler gives us every kind of information relating to the Frutigland, not forgetting the old custumals of Frutigen and Aeschi, and the fifteenth-century church in Adelboden. Mountaineers will be specially interested in the account of the Kandergrund (of which Kandersteg is the highest and best-known hamlet), which did not become entirely independent of Frutigen till 1860. Many details are given as to the ascents and passes to be made from each valley, but the book is strongest in local ballads, legends, and proverbs, a great number of which are scattered up and down its pages. It is conveniently furnished with a map, and contains several illustrations. Like all local handbooks, it gives us a vast amount of local information cast aside by works of a more general character, but very interesting to those making any stay in the district. Herr Stettler's modest book will be indispensable henceforth to all visitors to the Frutigland—often used as a place of transit, yet well worth a stay of some days or weeks.

Die meteorologische Station auf dem Säntis, ihre Geschichte und die bisherigen Beobachtungsergebnisse. Von R. Billwiller. (Zurich: Zürcher & Furrer, 1887.)

The new Meteorological Observatory close to the summit of the Säntis is said to be the highest permanently inhabited dwelling in Switzerland, for it stands at a height of about 2,500 mètres (= 8,203 feet), though two other observatories in other parts of Europe are even higher—that on the Pic du Midi (2,859 mètres) in the Pyrenees, and that on the Sonnblick (3,090 mètres) in the Salzburg district. Observations were originally begun in 1882 in the inn near the summit, and continued in that place until the new observatory was opened in October, 1887. This was built and furnished at a cost of about 60,000 francs, derived largely from a legacy left to the Swiss Natural History Society, the cost of carrying on the observations being (since March, 1885) defrayed by the Federal Government. Herr Billwiller, the director of the Central Swiss Meteorological Institute, is to be congratulated on the result of his unwearied labours. We are indebted to his pamphlet (28 pages only) for the foregoing details, and may add that they serve as an introduction to the tabulated results of the observa-

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tions from 1882 to 1887. When so much has been done with comparatively small means much may be expected now that the new observatory has been completed. It is a two-story stone building—solid, though not picturesque, according to the photographic view which Herr Billwiller prefixes to his pamphlet—and is connected with the plains by telegraph and telephone. It is intended to be to Switzerland what the establishment on Ben Nevis (4,406 feet) is to the United Kingdom, and has the great advantage of being nearly twice as high as the latter. We note that many of the instruments used are of English make.

PROCEEDINGS OF THE ALPINE CLUB.

A GENERAL MEETING of the Club was held on February 5, 1889, Mr. C. T. DENT, *President*, in the chair.

Mr. C. SCOT BAYLEY was elected a member of the Club.

The PRESIDENT announced that, in accordance with the wish expressed by many members, a portrait of the late Mr. W. F. Donkin had been ordered, and would be placed in the Club-room.

The Hon. SECRETARY and TREASURER presented the accounts for the year 1888, which were unanimously passed.

Mr. H. W. HOLDER read a paper on 'Expeditions in the Caucasus, including an Ascent of Koshtantau,' printed in the February 'Alpine Journal.' At the conclusion of the paper Mr. H. WOOLLEY, one of Mr. Holder's companions, spoke of the relative difficulties of Caucasian and Alpine mountaineering. His experience on Koshtantau and the Saddle Peak made him think that ascents in the Caucasus must always cost more time and labour. The actual climbing was not more difficult, but the peaks were steeper and the condition of the snow generally not so favourable as in the Alps. Their party was not well provided with an interpreter, and they could not ascertain the native names of many of the peaks. Their camping place at Missés Kosh was not favourably situated, and he would recommend future explorers to camp much higher up. An oil cooking stove should be taken, to obviate the difficulty of carrying fire-wood. Fair provisions could now be obtained at Bezinghi. The glacier scenery was magnificent, and their expedition as delightful on the last day as on the first.

Mr. D. FRESHFIELD trusted that the map before the meeting, drawn up in the Royal Geographical Society's map-room to illustrate his own journey in 1887, would dissipate any idea that the exploits of 1888 had exhausted the Caucasus either from a climber's or an explorer's point of view. Much remained to be climbed and discovered even in the portion that had been most visited. He desired to impress most earnestly on all who might take part in the further exploration of the peaks and glaciers of this chain the fact that, owing to the climate, snow and ice lie in greater quantities, on steeper slopes, and in more unstable condition than in the Alps, and that the judgment of even the best Alpine guides cannot at first be relied on in a region where their previous experiences may often prove misleading. The scale of

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the scenery also has invariably deceived new comers as to distances. Very early starts, as near midnight as possible, are desirable for all high ascents, both for the sake of the view and to avoid being benighted in the descent. Had he been an hour and a half later he would have lost the panoramas both from Tetnuld and Uku.

Mr. FRESHFIELD proceeded to comment on a passage added to the 'Introductory Note' of 'The Pioneers of the Alps' in the second edition of that work, and referred to in Mr. Holder's paper (p. 196). He affirmed that the allegations there made—namely, that the early explorers of the Caucasus exaggerated dangers and difficulties which, such as they were, arose from their own incompetency as travellers and want of introductions, and that their guides served chiefly as dragomen—were, in so far as they related to his companions and himself or to his guide, François Dévouassoud, without any foundation or excuse in fact.

Mr. F. C. GROVE said that in 1868 the dangers of travel in some parts of the Caucasus were very serious, and he could not imagine on what authority the editor of 'The Pioneers' based his statements, which were opposed to all that the speaker knew of the country. If he was to assume them to be correct he must suppose not only that Mr. Freshfield's published account of his travels was throughout loose and highly coloured, but also that his lamented friend the late A. W. Moore had been for years in the habit of deliberately stating what was untrue, a thing impossible to conceive for a single moment. A more absolutely truthful and accurate man than Mr. Moore never lived. Now undoubtedly the firm government of the Russians had made Suanetia safe; but it was very different in 1868. Proceeding to speak of mountaineering in the Caucasus, Mr. GROVE desired to congratulate Mr. Cockin on the ascent of Shkara, a most magnificent peak, which Mr. Moore and he had taken for Koshtantau. He could only express his unqualified admiration for the work done by Mr. Holder's party. The one fault he had to find with them was that they had done too much and left so little of that part of the range for others.

The PRESIDENT agreed with Mr. Freshfield as to the advisability of a very early start; the clouds usually come down at midday, and in the evening there is mist, snow, or rain. The mountains in this part of the Caucasus were no doubt very dangerous, and most explorers hitherto had had very narrow escapes. As to interpreters, it was useless to expect to obtain information through them; the natives have no names for peaks, but only apply them to masses. Last year Suanetia was safer to travel in than ever before, but it must not be forgotten that the Suanetians are a dangerous people to quarrel with. He concluded by moving a hearty votes of thanks to Mr. Holder for his most interesting paper, and Mr. Holder having replied to the vote which was accorded to him with great enthusiasm, the proceedings terminated.

A collection of paintings and sketches in oil and water-colour by Mr. E. T. COMPTON was on view during the meeting and for some days after.

Mr. W. BOYLE, of 9 Brunswick Square, exhibited and explained one of

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his 'Patent Portable Fire Escapes,' an apparatus weighing about 1½ lb., with a view to demonstrating its applicability to mountaineering purposes.

A General Meeting of the Club was held on March 5, Mr. C. T. DENT, *President*, in the chair.

Messrs. A. L. MUMM and T. RICKMAN were elected members of the Club.

On the motion of the PRESIDENT, seconded by Mr. D. FRESHFIELD, the thanks of the Club were unanimously voted to Sir F. Pollock for the great care and trouble taken by him in preparing the new catalogue of the Club library.

Dr. G. SCRIVEN read a paper on the 'Dolomites of San Martino di Castrozza,' illustrated by some photographs taken by himself and his companion. At the conclusion of the paper Messrs. GILBERT, FRESHFIELD, TUCKER, BUTLER, and FINNEY made some remarks, and the PRESIDENT proposed a vote of thanks to Dr. Scriven for his paper. Dr. SCRIVEN briefly replied to the vote, which was unanimously accorded to him.

A collection of water-colour drawings by Mr. Alfred Williams, of Salisbury, was on view during the meeting and for some days after.

A General Meeting of the Club was held on April 2, Mr. C. T. DENT, *President*, in the chair.

Dr. JOHN HOPKINSON was elected a member of the Club.

The PRESIDENT announced that Mr. E. T. Compton had presented to the Club one of his water-colour drawings recently exhibited at the Club Rooms, and the thanks of the Club were unanimously voted to Mr. Compton for his valuable and beautiful gift.

Mr. ARTHUR J. BUTLER read a paper on the 'Oetzthal District.' At the conclusion of the paper a discussion took place, in which Messrs. FRESHFIELD, RUSSELL STARR, HOLZMANN, and the PRESIDENT took part, and in the course of which the feeling was freely expressed that the district was far too much neglected by English climbers. On the motion of the PRESIDENT an unanimous vote of thanks was accorded to Mr. Butler, who briefly replied.

An exhibition of water-colour drawings by Mrs. Gibson (Miss Paine), Mr. G. Barnard, Mr. B. J. M. Donne, and Mr. H. G. Willink was on view at the Club Rooms on this and some subsequent days. (See pp. 330–1 of this number.)

Errata in Last Number.

Page 240, line 11, *for* 38·39° *read* 383·9 $\frac{\text{Russ. in}}{2}$ (= 19·19 inches of the English barometer).

„ „ „ 16, *for* 35·01° *read* 350·1 $\frac{\text{Russ. in}}{2}$ (= 17·5 inches of the English barometer).

„ 248, „ 7 from bottom, *for* were *read* was.

„ 250, „ 19 from bottom, *for* peak climbers *read* rock climbers.

„ 280, „ 3 from bottom, *for* 1888 *read* 1887.

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THE

ALPINE JOURNAL.

AUGUST 1889.

(No. 105.)

An Expedition to Mount St. Elias, Alaska.

By HAROLD W. TOPHAM.

THE country to which I wish to carry my readers lies at the far north-west corner of North America. Alaska is separated from Asia by Behring Straits, and from its sister states and territories by a portion of British Columbia. To reach Alaska you must cross the great American continent to the Pacific Ocean, and ascend the coast for one thousand miles. You will then be at Sitka, the capital of Alaska. But you must come further still. You must continue up the coast for another 250 miles to Yakatat, and then you will find the horizon to the north and east blocked from view by some of the most beautiful and inviting-looking mountains imaginable. From Cross Sound, north of Sitka, the St. Elias Alps run north-west along the coast. They rise out of the very waters of the sea, and tower above you to a height of 16,000 feet as you sail below. As they approach Yakatat Bay they take a grand curve inland back from the shore, and peak after peak, unknown and unnamed, attracts your attention, and your eye wanders on from one to another till it rests on the final and most beautiful of all —Mount St. Elias. This mountain, seen from Yakatat, is very sharp and steep, and although it is distant fully eighty miles, its proportions are yet so vast that you can well believe that it is nearly 20,000 feet high. To attempt the ascent of this mountain was the object for which I and three others started on an expedition during the summer of 1888. Mr. George Broke came out from Brussels, Mr. William Williams from Massachusetts, U.S.A., my brother from Florida, U.S.A., and I myself from England. Our food supplies and general outfit were collected from many places—from England, from New York, from Montreal, from Victoria, B.C., and from

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Sitka. At Victoria some little interest was taken in our expedition, but the local press was rather doubtful as to its object, as the following paragraph will show:—'The Messrs. Topham leave on the "Ancon" to hunt grizzly bear, and to explore far-off fields in Alaska. They take with them a full outfit of snowshoes and a variety of tools to aid them in ascending mountains.'

We were detained at Sitka for some time awaiting the return of a small fishing schooner which we had hired to take us up the coast. When at last she arrived, she had to be beached for repairs and to be freed from some of that offensive smell of seal oil with which she was impregnated. In the meanwhile we had bought stores of flour and bacon, enough for sixty days, and had hired six men to accompany us as porters, four of whom were Indians and two white men—'Shorty' and Harry Lyons.

'Shorty's' real name was MacConahy, but, as he was six feet two in height, he had naturally received the nickname 'Shorty.' His pal 'Harry' was reported to be the strongest man in Sitka. Both were thoroughly good fellows, and were of immense service to us in every way. Some two dozen friends assembled upon the wharf to bid us God speed, and they cheered us lustily as we sailed away, and sent after us an American flag to place at our masthead. We carried with us, too, a small silk flag, on which was embroidered our names and that of the lady who had worked it, Mrs. Hadon, the wife of the deputy-governor. This flag was to be left at the highest point reached upon the mountain.

The 'Alpha' was a centreboard schooner of twenty-five tons, with four feet draught. Her cabin contained eight bunks, two of which were used as pantry and larder. There was a cooking-stove below, and no ventilation whatever. The chimney always smoked, the ship was leaky, the captain knew nothing of navigation. The pump was in bad repair, and the canvas was rotten. The heat below was so intense that we had to be always upon deck, and there we lay like logs wrapped in our blankets. The worst point, though, about the schooner was that she drifted to leeward almost as much as she made on her course. This was particularly dangerous with a lee shore such as we were sailing along—a rocky shore with no harbours, with glaciers descending into the sea, and a surf tumbling for ever upon the beach. The distance from Sitka to Yakatat is about 250 miles, and we took seven days to do it, with a head wind for most of the time.

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Yakatat is an Indian village consisting of five houses, which afford shelter to 250 natives. That the place is extremely offensive to a white man's nose need not be stated. Provided that a government gunboat has been along the coast shortly before your visit the people will be friendly; if it has not, you had better keep away.

Our entrance into Yakatat was not propitious. The chief had raised his flag, and all the inhabitants were congregated around the village—to see what? To see our skipper run his ship on to a reef of rocks not three hundred yards from the anchorage; and there we had to stay all night, listing more and more over on to one side as the tide went out. Next morning we beached our vessel for repairs. At Yakatat we found a Mr. de Groff, who was trading with the inhabitants, and acted as interpreter for us in our negotiations with them. Our arrival had been looked forward to by them with great expectations of the golden harvest which would follow. An Indian whom we had dismissed at Sitka had sent up word that some very wealthy 'King George men' (*i.e.* Englishmen) were coming, and that Yakatat might look forward to having a good time generally. Partially on our account the Yakatats had delayed starting upon their annual sea-otter fishing, and we soon found that we had done wisely in bringing with us men from Sitka, in order to be, in a measure, independent of the natives. However, we required more men, and so we paid a state visit to the chief, who had donned his best clothes for the occasion. He had on an evening dress waistcoat and trousers, and a naval cap; and he stood, surrounded by his dirty family, at the foot of some feather mattresses, on which he requested us to be seated. He was much more interested in our clothes than in answering our questions about canoes and men; but he made great promises of assistance, more, in fact, than he had the power to keep, and he made us promise, on our part, to give him, upon our return, so many of our clothes that we should have been reduced to a state of nature if we had afterwards adhered to our word. Many of the natives came in and out of the house to stare at us, and amongst the number was a big Indian with a face which appeared to be always upon the broad grin. It was as though the whole of his lips had been turned inside out, exposing the gums to view, and this was his nickname—'Gums'—a name given him by Schwatka, who had hired him as a porter two years previously. We hired 'Gums' at once, but no more business was done. An Indian will not be hurried. For two days

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there were frequent 'pow-wows' amongst them, and de Groff was for ever upon the move, acting as emissary between them and us. Irritated at the delay, we hired two miners who happened to be in the neighbourhood, and we then threatened that unless men and canoes were supplied at once, and upon our own terms, we would sail away in the 'Alpha.' This had its effect, and ultimately we hired two large Haidah canoes, and purchased one smaller canoe of the Yakatat pattern. We hired ten Indians, of whom eight were to return to Yakatat in one of the large canoes after landing us upon the beach, and two were to stay at the base camp upon the shore to take care of the other canoes and such stores as we might leave behind.

We were all anxiety to get away, but the Indians declared that the weather was unfavourable, and here I may say that the weather always is bad if the Indians wish it to be so. On the other hand, they know when the weather is really threatening; the white man, therefore, is helpless in their hands. He knows not whether they are lying or not when they state that they dare not start upon a journey. In the present case we felt sure that they were lying, so we ordered that all should be ready for a start at 3 P.M. And when the time arrives we have got all our stuff (some two tons' weight) into the canoes, the village has turned out *en masse* to see us depart, and the chief, in his robes of state and with his infant son in his arms, is standing at the edge of the water, so that he may be included in the photograph which de Groff is to take.

Two pictures are taken and we push off. Oars and paddles splash into the water, the Indians scream aloud and shout, and a great race ensues for the nearest headland. Once round this our men sober down to their work and row steadily out to sea for an hour. And then they declare that a storm is approaching and persuade us to return, which we do, with our tails between our legs. No storm comes, and we feel that we have been fooled, and that our Indians wish to be present at a feast that is to be held this night in the village. So we spent another horrible night upon shore, surrounded by dirt and dogs. These dogs are everywhere; they are innumerable. They steal everything they can get at and are very clever in their methods of searching after food. When they are unable to pull down the barriers you have erected at the door of your tent, they do as the Romans of old, they undermine the walls, and you are awakened in the middle of the night by feeling a scraping beneath the

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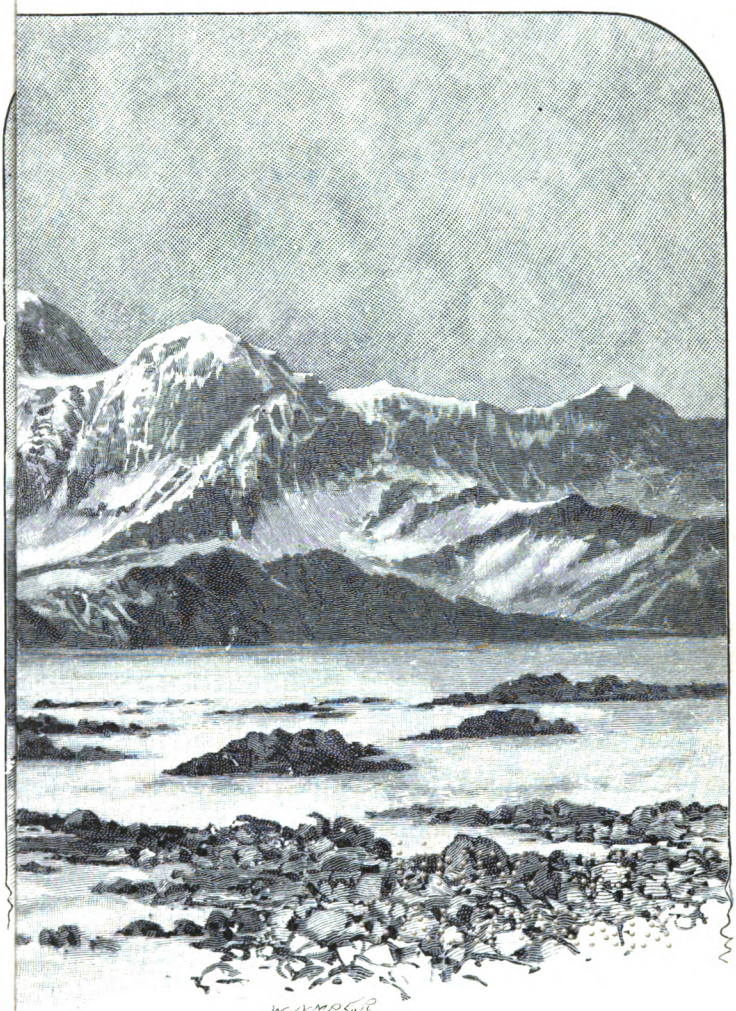

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small of your back. It is only a Siwash dog investigating for food! At 11 A.M. the next day we are again under weigh. This time there is no admiring crowd, no camera, no chief, no racing! We just leave—that is all! On the other hand everything goes well. We get all the wind we require and arrive at Icy Bay at 8.45 P.M., having made the distance, fifty-seven miles, in $9\frac{3}{4}$ hours. Very frequently it is impossible to effect a landing, so great is the surf, but to-day the sea is moderately quiet, and we land without much difficulty. The small canoe lands first. It is easier to handle, and its crew will be of service to help those who follow. My canoe comes next. We daintily approach the shore and bide our chance of getting a large wave to carry us well up on to the beach. The men on shore are watching for the same thing, and all at once they shout and scream to us to come. We feel ourselves lifted on the top of a big wave, and we use our oars and paddles with frantic energy. We come in upon the wave, the men on shore rush into the sea and seize the bows. We jump into the water up to our waists and we haul at the canoe to get her beyond the reach of the next breaker.

The canoe is too heavy and must be lightened. We seize upon anything that comes to hand and run with it up the steep shore to throw it down beyond reach of the waves. The canoe thus lightened is run up high and dry, and we now prepare ourselves to help the third canoe, which comes in, is seized upon, lightened in the same way, and finally hauled up. None of the stores have got wet, but what a state of confusion upon the shore! Here are more than 1,600 lbs. of goods. Fruits and tea, flour and kerosene, a camera and ice-axes, a stove and blankets, pilot-bread and bacon, dried salmon and corn meal, snow-shoes, flour and frying-pans, things of all descriptions lying as they were thrown, scattered anywhere and everywhere along the beach. We collect the things together and pitch our tents. We are quite a crowd, twenty-four of us in all. Our four selves, our four white men, the four Sitkans and four Yakatats are to go up to the mountain, two Yakatats are to stay upon the beach, and the rest are to return to the village.

A few words about the coast. The small headland called Point Manby, is the point for which the Indians steer when crossing Yakatat Bay. It is nothing else than part of the huge terminal moraine of the Malaspina Glacier, which bounds the coast for more than sixty miles and stretches back as many miles to St. Elias himself. The moraine is

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several miles broad and is covered thickly with brush and larches. In places along the shore the ice protrudes from beneath its covering of stones and trees, and discovers the nature of the high banks along which we pass. Fifteen miles west of Point Manby the ice asserts itself. There are no more trees for the next ten miles and no landing of any kind, but after these ten miles the glacier gives way and admits quite a large tract of flat, swampy land between it and the sea. This land has been in part washed up by the sea and in part deposited by the numerous glacial streams which run through it. It is covered with trees and thick underbrush. Of the glacial streams the chief is the Yahtsétăh-hein or 'Muddy Harbour River.' The Indian name for Mount St. Elias is Yahtsétăh-shah, and there is a tradition amongst them that the sea once washed the very foot of the mountain, that there was an Indian village there at the foot, and that all around that village there were mud flats. So they called the mountain 'Muddy Harbour Peak.' But Schwatka, who was the first white man to visit the neighbourhood, re-christened the river, and gave it the euphonious title of 'Jones River'! There is a tale told of the proceedings of a nigger club in Tennessee. The committee on astronomy presented their report. They had discovered several planets—Venus, which they called Sarah Jane; Jupiter, renamed Charles Henry; Mars, Andrew Jackson; and Saturn, Sam Johnson; and they desired all other societies to take notice of the fact.

The Indian tradition states further that the ice subsequently descended and covered up the harbour, but the river which flows beneath that ice and descends into the sea close to where we were encamped, is still called the Yahtsétăh-hein. This river issues out of the ice some ten miles back from the shore, and immediately becomes divided up into innumerable small streams, which divide and subdivide the broad mud flats which lie between the glacier and the sea. The water is whitish grey, being saturated with glacial mud and sand. There are bad quicksands all along the streams, and these make wading very difficult, if not dangerous. Not only is the water icy cold, and in places swift, but there is no sure footing to be obtained. The banks quiver and shake like jelly fish as you tread upon them.

Bordering the tract of land lying between glacier and sea, and at the edge of the glacier itself, you will notice some hills 500 feet high, and covered with trees. They are not hills at all. There is nothing there but ice

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covered with moraine, upon which a dense vegetation is growing.

On the side of the river opposite to that along which lies our route, there is nothing but a wall of clean ice. The glacier there descends into the sea, into which large blocks of ice are continually falling.

But let us return to the shore, where we have left our party encamped. The morning after landing we had some difficulty with the Indians who were to return. They wished to stay where they were and fish. On the other hand, I had promised to pay them so much per day until they returned to Yakatat, and I intended to ship them off as speedily as possible, because the longer they remained with us the faster would our supplies diminish. Eventually we compromised. I was to pay them three days' wages, and they could leave when they pleased; but they were not to sponge on us for food. They might eat seal blubber, or any other nastiness they chose, and we gave them some flour to help it down. The morning of this day was spent in reconnoitring for a route to the glacier. In the afternoon a storm of wind and rain commenced, which lasted without intermission all through that night, and late into the following day. With the exception of the rain, which fell two days later, the weather was perfect the whole time that we were in the neighbourhood of Mount St. Elias. On the day following Williams and I prospected up the river near which we were encamped. We got into the brush too far, and after wading for hours over swampy ground examining the banks of the river we concluded that we ought not to try 'packing' (*i.e.* carrying goods) by that route. The next morning (July 16) we got away, after endless bother dividing up packs, deciding what to take, and what to leave behind. We expected to have to walk over ice for at least thirty miles, and our plan was that at every ten miles or so a 'cache' should be made, and that whilst we ourselves pushed through to the mountain with two Indians to help 'pack,' the rest of the men should be occupied in bringing up stores from the shore camp, making several journeys from mountain to sea for that purpose. In this way at one time we had a supply of food at six different places.

'Gums,' who had been part of the way on a previous occasion, and who, therefore, considered the country as his own private property, was ordered to lead off along the shore to the Yahtsétäh river. At first the Indians laid down their packs at every few hundred yards, but as this would never do

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I ordered them not to stop till I did. This worked well for a few miles, until we came upon a most remarkable patch of wild strawberries. They grew upon the sand in acres, and were so large and numerous that they gave a pink tinge to the shore. They were too much for the Indians; off went their packs, and down went every man upon his belly, and gorged steadily for twenty minutes. Our packs being once more resumed, we descended into a branch of the main river, and waded across. This was our first experience of what was to follow. From now until we got up on to the glacier we did little else but wade and walk over soft mud and sand flats, sometimes up to our knees, and sometimes up to our hips in the icy cold water. Some of the party, notably Lyons and 'Shorty,' chose to wade without boots and socks, in order to keep them dry for the night, and they were in consequence nearly paralysed with the cold. 'Gums' was in his element. He thoroughly enjoyed the water, and sometimes he would stand half-way across a stream with the water up to his chest, with his arms folded, and with a grin of delight upon his huge gums, waiting calmly whilst the rest of us shivered across. Occasionally we thought that he was purposely leading us through more water than needful, especially on one occasion when he told 'Shorty' that we had passed through the last water, and then, when 'Shorty' had put on his boots, led off at once through three streams of water; and I think that he was nearer getting shot on that occasion than he had any idea of.

It rained at intervals very heavily, and we were not sorry to reach a damp wood surrounded by water, in which we were able to camp. Although there was nothing but wet moss and decayed vegetable matter, even this was preferable to the river flats. On the morrow we continued up the river for two hours, and then two of us forced our way up the side of the glacier to our right, to see whether we could find a more preferable route. But the undergrowth was too thick, and after ascending five hundred feet we gave it up. We returned to the river, and continued up the banks with the water to the left and the glacier to the right, to a place which 'Gums' said was good, and whether that place was better than the other I don't know, but all agreed that it was as bad as they needed. We were about an hour and a quarter forcing our way through the bush, and had often to take our packs from off our backs to get them through the branches. The most awkward article of all was the small kerosene stove which one of us carried on the top of his

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pack. It could not be strapped on like the other packs, for the pressure of the cords would have injured it. It had, therefore, to be balanced on the top of the pack, and kept in position by a stick held across one shoulder, much in the same way as a tramp carries his bundle. That stove was for ever tumbling about; branches caught it, any sudden jerk would throw it off its balance, and it was a curse to its bearer from first to last. Crevasses had to be jumped, tumbles were inevitable, and yet that stove had to be taken along, for we were under the impression that vegetation would cease as we ascended inland, and that we should have to rely upon the stove for warmth and cooking. On the other side of this bush which fringes the glacier, we came out upon billows of ice covered with stones. All ups and downs. Up one hundred feet, then down one hundred feet. This is the nature of the moraine, which is perhaps four miles wide, exclusive of that part which is covered with brush. In one of the hollows we pitched camp—everyone for himself, raking away the larger stones to get at the gravel below, or cutting alder branches to lay over the rough ground, all intent upon making as good sleeping places as the place could afford. At the bottom of the hollow we found a stream of water running over the ice, and this was the first drinkable water we had found since leaving Yakatat. All the other was saturated with sediment and of the colour of milk.

An early start was made next morning, our intention being to get off the glacier on to some hills which lay between us and St. Elias. Our route was due north at first, and then N.N.W. to the depression which runs from the above-mentioned Chaix hills to the mouth of the Yahtsétăh. This depression in the ice is the boundary line between the Malaspina Glacier on the east and the Guyot Glacier on the west. It lies immediately over the river itself, which is far, far below. I think that on occasions a great stream of water must flow down this depression, as it resembles a watercourse very closely, and has many thick beds of mud and sand. After two hours up this depression, we turned N.E. to get well on to the Malaspina Glacier, and steered for the N.N.E. end of the Chaix hills. 'Gums' was now deposed from his office of guide. He had not proved a success, and was always trying to show off before the other Indians. At one place we had found it necessary to caution the men how to go. A slight descent had to be made down an ice slope on which was a quantity of wet mud and stones. None of our men, with the exception of 'Gums,' had been upon ice in

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their lives, but they all descended in safety. Not so 'Gums.' He had been standing aside with a scornful look upon his lips. He needed no advice. He could walk down with ease. And he came down a dreadful bump upon the ice, laden as he was with some 70 lbs. upon his back. He limped and made much of his hurt, but getting no sympathy the limp disappeared, and though he was undoubtedly hurt, 'Gums' never said another word about it.

The Chaix hills are almost entirely surrounded by ice. On the north-west is the Tyndall Glacier, which flows into the Guyot Glacier. This last runs along the south side of the hills. On the east is the Malaspina Glacier and on the north-east the Libbey, a tributary of the Malaspina. Some low hills connect the north end of the Chaix hills with Mount St. Elias. You can thus approach St. Elias either to the west or east of the Chaix hills. Our plan was to attack it on the east from the Malaspina Glacier. After walking for three hours we resolved to get off the ice on to the hills rather than pass another night upon the glacier. So we turned westward, and after some very tiring plodding between and over the mounds of *débris* which form the western moraine of the glacier, we arrived at its edge, which, to the surprise of some of the party, proved to be a cliff of ice from two to three hundred feet high, with a swift stream running at its foot and separating the glacier from the hills. We had to continue up the glacier for more than a mile before the slope of the ice would permit us to descend into the stream. This we waded just as night was setting in, and very glad we were to get into camp. We had been 'packing' for more than twelve hours over a very tiring glacier. Our boots were already showing signs of the hard work, and the Indians were complaining of sore feet.

The next morning we selected two of the Sitkan Indians, Billy and Jimmy, to stay with us, and sent the rest of the party back to the shore to bring up more food. We who remained behind followed up the course of the stream. The shores of the stream were preferable to the stone-covered glacier, but we were obliged to wade across and across as we advanced. The stream was not wider than sixty feet, and not deeper than three, but this is quite sufficient to chill any ardour when the water is swift and at a temperature of 32°. Banks of dirty ice two hundred feet high bound the stream on the east, and upon the west are the Chaix hills all covered with bright vegetation, flowers, and grass and trees. This is characteristic of the country:

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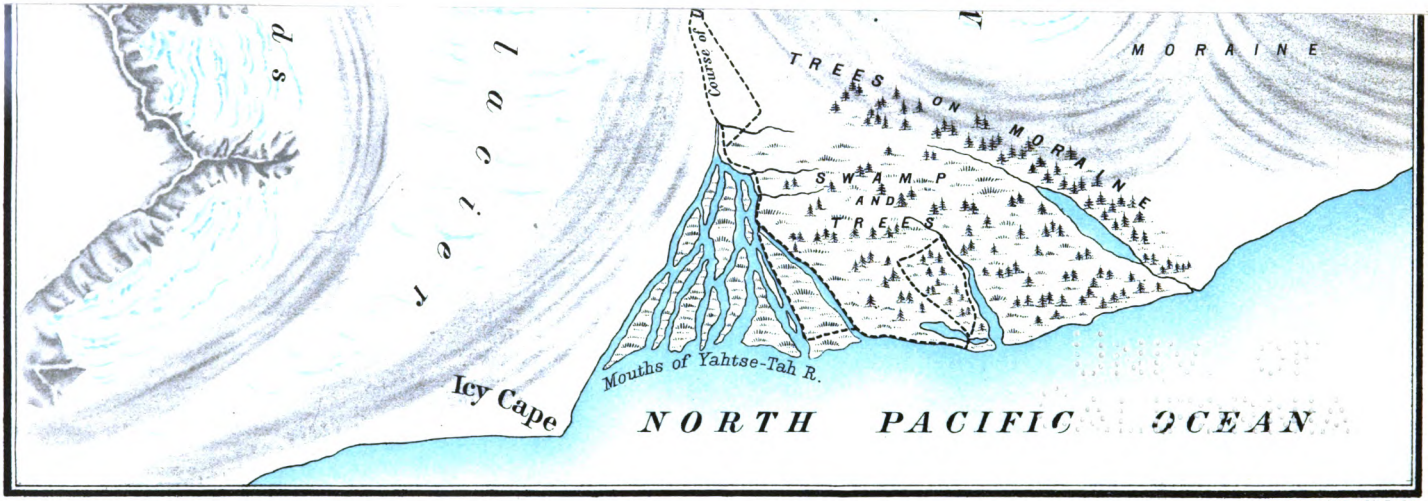

SCALE OF STATUTE MILES

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wherever there is vegetation, it descends to the very edge of the ice. Three miles up the stream from where we first touched it there is a charming lake, and here, on July 20, we pitched our tents. Our course beyond this camp was always up the stream; sometimes on one side and sometimes on the other. We skirted the lake along a very narrow fringe of stones which had fallen from the glacier above. Three miles above this lake there is a cañon formed on one side by the glacier, and on the other by a steep bluff, which is in reality an old moraine; the stream runs between. Here there were countless mosquitoes and stinging flies. About half a mile above this cañon the stream issues from below the ice. A little further on the glacier infringes upon the hillside, and we were obliged to get upon the ice. There is another lake above, the waters of which are dammed up by the glacier. At the place where glacier and hills meet, the lay of the latter is north and south, and the glacier strikes the hills' side nearly at right angles. At this point it is evidently advancing fast, for it is piling up stones against the hill very rapidly. The hill is steep, and is covered with trees and a thick growth of high grass, ferns, and flowers. From the river bed below to the lake above, a distance of a quarter of a mile, there is a rise of some 250 feet, and as we walked we could step with one foot upon the glacier and the other upon a luxuriant growth of vegetation. So fast is the ice pushing on and swelling its stones up against the hill, that quantities of the smaller trees, alders and the like, are bent down and half covered with stones, but none the less alive, and doing their best to see the light of day before being entirely crushed out of sight by the ice. Above the lake last mentioned the stream continues for about four miles to the north-east extremity of the Chaix hills. Here it has its rise from out of the glacier (the Libbey) which descends from the foot of St. Elias itself, and unites at this point with the Malaspina. We found no way round the edge of the lake. The glacier descends abruptly into the water, and is very much crevassed above, so we were obliged to make a circuit, starting from a point just above the cañon below, and traversing the worst bit of up and down, boot-cutting, foot-bruising, patience-destroying, and oath-inspiring five miles that I have ever experienced. Arrived at the corner of the hills which had been our goal for so many days, we ascended the icefall of the Libbey Glacier and found ourselves upon a level plateau of ice stretching back for six to ten miles to the mountain itself. The aneroid gave 1,625 feet,

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of which about 1,000 feet was the height we had ascended up the icefall. The plateau before us was evidently covered with *débris*, which appeared every here and there from beneath their covering of snow. The mounds of stones which troubled us so much below were absent up here. All between us and our peak was quite level. The Chaix hills on our left were beautiful slopes of the greenest grass, and we could see upon the foot hills away to our right that there was vegetation also there to a height of certainly 500 feet above the glacier.

From where we were we made a very careful study of our mountain. I had brought up a large telescope for the purpose. We reluctantly came to the conclusion that the peak was practically unclimbable from this side, and that we should have to make a circuit of the Chaix hills and try the south-west face, which descends on to the Tyndall Glacier.

Speaking generally, the whole of the south-east face of St. Elias is a mass of overhanging glaciers, and the steepest of snow and ice. The eastern arête is extremely steep and very long; to get on to it would take a day in itself. We could see part of the south-west face of the mountain. There is a curious depression upon it which very much resembles a crater, and the rocks of this crater appeared as steep as the side of the Lyskamm which descends to the Gorner Glacier; but it was up these very rocks that we climbed subsequently, and we found them very much easier than we had expected.

Turning our backs to the mountain, our eyes wandered over the vast sea of ice stretching away for sixty miles to the waters of Yakatat Bay. On the north of this sea are innumerable peaks, only two of which have received a name—Mounts Cook and Vancouver. Far away to the south-east, 150 miles distant, the summits of Mounts Fairweather and Crillon stood out from above the clouds. We had passed by the foot of these peaks on our way up to Yakatat.

After taking several sketches and photographs we returned to camp by a slightly different route. We kept down the stream with the glacier on our left hand, and an old moraine on our right, and when we arrived at the first lake we took to the ice, and once more stumbled along it, descended to the stream below the lake, and so home to camp. On the following day we 'packed' down to our old camp, the Indians having to make several trips to bring down all the stuff.

On July 23 we 'packed' down the stream to Lake Castani, pitched camp, and sent the Indians up stream to bring down the goods. We ourselves started out to find a route up the

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Guyot Glacier. It was here, at Lake Castani, that we intended to stay until rejoined by the men who had descended to the shore.

Lake Castani lies at the southern extremity of the Chaix hills. On the side next the hills are thick woods. Everywhere else there is ice, and in the lake itself there were many icebergs, which had broken away from the glacier. The stream that we had ascended to the east of the hills runs into the lake at one end, and a much larger and very rapid torrent runs in at the other end from beneath the Guyot Glacier. The lake, therefore, is at the confluence of the two streams, and receives water from both sides of the Chaix hills. As there are several small lakes along the stream to the east, so there are lakes also up the stream to the west. The Guyot Glacier descends in an icefall near the western end of the lake and thrusts itself against the hill-side, thus covering the stream. Once above the icefall you see no more of the stream. It is beneath you, under the ice. The lakes on the western stream are constantly filling up and emptying according as the outlets from them become choked or not with floating ice. When the outlets become choked, the water in the lakes rises to a great height, bursts the barriers, and hurls itself down the stream into Castani. This lake then rises some 150 feet, and bursts its own barriers. Now Castani is the chief feeder of the Yahtsétăh river. This river therefore rises and falls conversely with Castani. Along the north shore of the lake the high-water mark is very distinct, and the ground is strewn in places with icebergs weighing hundreds of tons. When our men left us for the shore camp they found the lake dry and crossed its bed, and so saved themselves a long *détour*; but on their return the lake was half full, just as we ourselves had found it. Before this digression I left our party on the point of starting from Castani to the westward. We forced a way through very thick brush up the hill-side above the stream, and when we had got above the icefall we crossed over on to white ice and continued up the glacier, just skirting the moraine and passing between several smaller icefalls until we arrived close to the western extremity of the Chaix hills, on to which we then crossed. The glacier here is about 1,000 feet above Castani. This end of the Chaix hills is covered with grass, and has much alder upon it, and a few trees. There is a long lake to the west and north, somewhat similar to Castani, and there is also a beautiful little lake three hundred feet up above the glacier.

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It was by this lake that we subsequently camped for several nights. We saw here a quantity of ptarmigan, but our guns had been left behind on the beach.

We returned to Castani, and next day my brother and Williams cut a trail through the thick bush mentioned above to enable the packers to pass through. Broke and I stayed in camp during the morning mending boots, and afterwards conducted the Indians through the trail to an old water-course, where we made a *cache*. During my absence the men from the shore camp arrived at the east end of Castani. They had intended (as they had been directed) to walk to our first camp up the stream, but seeing the fire which we had lighted to attract their attention, they came within shouting distance, and there ensued between them and my brother a screaming conversation the merits of which I have never been able to appreciate. The effect was this, that Broke came after me to suggest that I should get on to the glacier and go round Castani to meet them, and this I did. I got up to my knees in glacier mud, tired myself out with yelling and my eyes with sweeping the glacier with a telescope to find the men, and when at last I returned to camp I found the whole party just finishing a very hearty supper. They had continued up to our last camp, and had then descended the stream.

Next morning we all ascended to the west end of the hills, and encamped on the edge of the small lake. The views from around this camp are magnificent.

There is one in particular, of St. Elias, which combines beauty with grandeur. You come suddenly upon it as you emerge from between two small hillocks covered with flowers and scrub. You find yourself standing in long grass and flowers. The glacier is 300 feet below. Between it and you is the long lake curling around the small points of land which slope down from the Chaix hills. All to the left of the lake is ice; all to the right is green; the lake itself is beautifully blue, and studded with icebergs. Away beyond stretches the Tyndall Glacier, with a glimpse of its big ice-fall in the far distance. The Chaix hills confine it on the right, and another range is on the left. Above all, at the head of the glacier, towers St. Elias himself, stretching one huge arm to the east and the other to the west. There is a delicate colouring of blue over everything—glacier, hill, and mountain.

This end of the Chaix hills was the scene of a very curious performance on the part of my brother and some

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of the others. As they were leaving the moraine for the hillside they noticed a little lake with a number of half-fledged geese upon it. Pistols, stones, ice-axes, and sticks were hastily prepared for action, the packs were thrown aside, and all rushed to the lake. The geese took refuge in a small cave beneath the glacier, but their pursuers were after them, and passing under an ice-arch which looked rather shaky, they found themselves in a cave about 20 feet long by 10 broad. Hunks of ice were floating about in the water, and on these the pursuers walked. The geese had gone to the furthest extremity of the cave, and were shut in. My brother called out to prevent shots being fired, fearing that the ice-arch might tumble and bury everyone. But it was of no use. There were the geese, and here were a lot of hungry men anxious to get fresh meat for supper. So everyone blazed away at his own sweet will, and it was a wonder that no one was shot. The birds nearly succeeded in getting away, and would have done so had not my brother stepped hastily on to a bit of floating ice at the opening to the cave. The ice gave way, and he was in the icy water swimming. But his mind was on his supper. He grabbed at one bird and then at another, and caught several by this means. There were in all eleven birds, and of these ten found their way into the stewpot that night. The place became associated in our minds with the great goose hunt, and we knew it afterwards as 'Goose Point.' Upon another occasion, and on the other side of the Tyndall Glacier, other geese were killed by Billy and Jimmy. Ice-axes were the weapons used.

Next morning we crossed the Tyndall Glacier, and ascended it as far as the N.E. point of the hills upon the opposite side. Seen from Goose Point this place appeared to be conveniently situated for a base camp near the foot of our peak. In reality, as we found afterwards, the mountain was far distant. We now selected Billy and Jimmy to stay with us, and sent the other men, with the exception of Lyons and 'Shorty,' who were to return and stay at Goose Camp, back to the shore for more food. Williams and I prospected up the glacier, and found it very much crevassed. We selected a place for a further camp, and moved up there on the following day. Some discontent had been shown by the two Indians at having to stay behind with us whilst the others returned to the shore. They had hoped that they too would go down and have a good time on the sands, eating seal-meat and strawberries, and sleeping away the day. They

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said that they were afraid to go further up the glacier with us, so we thought it advisable to send back for Lyons and 'Shorty.' Our Indians were also afraid of being left alone in camp whilst we were absent. They were afraid of bears, of the existence of which there were plenty of evidences. Indeed, we had pitched our tents within three feet of a regular bear 'lay.' The grass had been all trampled down and crushed where the beasts had recently been lying. On one occasion we startled a very big bear, which made off at a great pace across the glacier towards St. Elias, jumping the crevasses in grand style. A day or two afterwards a St. Elias grizzly bear and a black bear visited the camp at night, and two or three bears were seen by 'Shorty' upon one of the lateral moraines of the Tyndall Glacier. Luckily for us, as we had dropped our rifles *en route*, we were never attacked. From our camp near the point to our new camp the route lay first over grass (½ hour), and then on ice and moraine (2 hours). Two glaciers descending from the hills on the west were crossed at their point of junction with the Tyndall. The first of these we named the 'Daisy Glacier.' It is beautifully level and white, and is quite a refreshing contrast to the glaciers over which we had previously been travelling. At the junction it is considerably below the Tyndall Glacier, so that the latter actually drains on to it. The Tyndall Glacier itself at its juncture with the Guyot is from 50 to 100 feet below the latter, except on the edge close to Goose Point. At the corner of the hills at the other side the Guyot is several hundred feet above the Tyndall, but there is an icefall there. As seen from Goose Point the line of junction between the two glaciers is so marked that there appears to be a high bank of ice and *débris* right across from point to point.

The second glacier which we crossed we named the 'Coal Glacier.' It is nearly covered with *débris*, amongst which is quite a quantity of coal. Seams of coal are visible on the hills around this glacier, and we even burned some of the mineral upon our camp fire.

This glacier is also lower than the Tyndall at their juncture. The *débris* upon this glacier consist mostly of a kind of slate in which are many fossils.

There is one curious characteristic of the Tyndall and Agassiz Glaciers. As you travel over them, and when you are upon white ice (*i.e.* uncovered with *débris*) and see white ice for perhaps miles around, you are suddenly confronted with an island of *débris*, apparently disconnected from any

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regular moraine. It springs from nowhere, is quite isolated, and appears to have no reason for being there. Upon the Agassiz there are several of these islands, which must be 100 feet high, and form quite noticeable landmarks upon the otherwise flat ice. We conjectured that perhaps at one period of the glacier's existence these islands formed part of a continuous moraine, that subsequently the glacier grew bigger, owing to heavier snow-falls, and swallowed its moraine, and that now parts of this old moraine are once again showing up, now that the snow-fall has again decreased. A peculiarity of the Guyot Glacier is the quantity of glacier mud which collects in hollows and terraces upon the ice near lake Castani. The whole glacier drops considerably along its line of junction with the Agassiz, but the drop is greatest near Castani, and there it is that the mud collects. To descend to the lake is quite a task. Hollow after hollow is full of the mud, which is ever kept wet by the rivulets of water which descend to the lake. The mud is often covered with small stones, which cause you to think that the surface is hard, but when you tread upon it you sink to your knees, and have some difficulty in getting free. The moraines upon these glaciers are different from those in Switzerland. Here they are several miles broad and resemble a choppy sea which has been rained upon by stones.

To return to our new camp at Coal Glacier. On July 28 my brother, Broke, and I started up the Tyndall Glacier to find a way round a far point of land, and ascertain whether we could get up to the very head of the glacier. Broke, whilst jumping a crevasse, let fall his only pair of snow glasses, and returned to camp, afraid of injuring his eyesight. This mishap was most unfortunate. The glasses were of a peculiar pattern and could not be replaced. Their loss compelled him to give up the attempt to climb the mountain, and he stayed behind at Coal Glacier Camp when the other three pushed on. My brother and I went some way up the glacier after Broke had left us, but we got badly mixed up in terribly broken ice. The crevasses were partially covered with snow of the most rotten description, and after we had had several narrow escapes we determined that we were acting like fools and returned to camp, where we found Williams, who had brought up 'Shorty' and Lyons with him from Goose Camp.

Next day the three of us 'packed' across the Tyndall Glacier with 'Shorty' and Lyons, taking with us food for five days, and one of our tents. We took with us also a tin of

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kerosene and the stove. We had brought this stove along with us, but had not as yet had occasion to use it. Still, it might yet be needed. Billy and Jimmy were left behind us. They were discontented, and, as we heard afterwards from Broke, spent most of the time whilst we were absent in chanting mournfully. When asked the reason why they chanted they said that 'Indians had sick tumtum and want to go home.' Starting from camp we crossed almost over to the other side of the glacier before turning north. This was to avoid the broken ice of the day before. We had given up our intention of ascending to the head of the glacier, and were now seeking a way to the nearest rocks which descend from the mountain itself. In this we were successful after several attempts, and this night we camped at the foot of our mountain. The so-called crater was above us, and descending from this crater are several steep arêtes. Our camp was upon a small hill at the foot of one of these arêtes, and the hill so much resembled in shape the hoof of a horse that we called the camp 'Hoof Camp.' On the same day that we reached this hill the three of us, Williams, my brother, and I, started out to investigate the north of the hill. Our course was first over snowfields to the west, and then up a small glacier to the foot of a steep snow col which connected our hill with one of the arêtes. We had to cross several schrunds, and we then cut our way up the col. From the top of the col we struck up the arête, which consisted of very rotten rocks and loose stuff of shale and slate, which crumbled away at the touch. We made very slow progress and eventually turned back, convinced that a successful attempt on the mountain could not be made with such an arête to begin with. But we had made one great mistake. We had deserted the edge of the arête and had tried to get up its face. Had we kept to the former the climbing would have been much easier, as was proved subsequently on August 2. The aneroid gave 3,000 feet for Hoof Camp, 4,550 for the top of the col, and 5,725 for the highest point reached. We returned to camp round the east side of Hoof hill, and from this side we noticed that the arête above where we had been appeared to be less steep, and we therefore determined to give it another trial on the morrow. We found some small brushwood (cotton-wood) on the hill, not much, but sufficient to light a small fire, so the kerosene lamp was not yet called into requisition.

Early next morning we started again to have another try at the arête, but after we had gone half an hour we changed

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our plans, and crossed over to the next arête to the west. We found it very bad indeed; the first two hours were up loose shale dust, which had to be passed before we could get on to the edge of the arête. We kept along the edge the whole way up, first over sharp fibres of slate resembling slate pencils, and then over steeper rocks of shale and some snow, till we came to a gendarme, which was easily turned. Next came much steeper rocks of shale, and these gave place to ice. This ice was the top edge of two snow-slopes, which descended on either side of the arête. The ice was covered with two inches of rotten snow. We cut about 150 steps up it. Regular graves they were; but we had to descend the same way, and a slip would have been fatal. We were an hour upon this ice. Above it were more rocks, all very rotten, but we scrambled up them somehow, and reached the edge of the crater at 4.40 P.M. Aneroid 7,650 feet. We had been eight hours upon the arête. Although on the edge of the crater, we could see nothing. It was full of clouds, and clouds were rapidly forming about our arête, so we made haste to descend, and reached camp at 10 P.M., where we found 'Shorty' and Lyons on the point of starting out to see what had become of us.

Two things had been gained by ascending this arête.

1. We were agreed that it was not the correct route.

2. We had seen from high up on it that the arête of the day before was not so steep near the crater as it was further down.

During our absence to-day Lyons had had a successful chase after some ptarmigan with sticks and stones. He cut one head clean off with a beautiful shot with a stone, and he procured in all the hen-bird and seven of her young. Bears had visited the camp whilst the men were sleeping, but no harm had been done.

Notwithstanding our birds, we found that our supply of food required replenishing, our appetites were so large. We therefore crossed over the next day to Coal Glacier Camp and got more stores. Broke was absent, and I remember that we found a lovely pudding of rice and raisins which he had laid aside for supper. This we took with us, and thought kindly of him when we ate it on the other side. On the afternoon of this day we made our preparations for a final attack on the mountain. We scarcely expected to succeed in getting to the top, for we had now become convinced that 'Shorty' and Lyons were not capable of climbing the arête, and without their help we could not carry up tent, food, and

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blankets sufficient for a night or two above the crater. We determined to get as high as we could. We found some marmots amongst the rocks, and these we killed with our ice-axes, and afterwards stewed. A curious spectacle we presented as we made our way up the steep snow-slopes towards the col. We all carried our usual packs upon our backs, but besides these, Lyons bore in one hand a kettle containing the stewed marmots, and I carried a coffee-pot full of stewed California figs. The juice from these figs leaked from out of the coffee-pot and dyed the snow along our route. Our *bête noire*—the kerosene stove—was still with us, and was borne to its last resting-place. Our other bugbear—the camera—which had always to be carried by hand, we left at Hoof Camp. We ascended to within a few hundred feet of the top of the col, and camped upon a small patch of stones. We lit our stove, and found that it refused to boil soup under half an hour, although we supplemented the fire with wood split from off a box. Harry and 'Shorty' expressed a wish to return to the lower camp rather than remain up in the cold with us, so we let them go. 'Shorty' had a grand fall at the steepest place, where the snow ceases and gives place to stones. He threw away everything he was carrying, and then fell down the slope himself. 'Shorty's' account was: 'I seed I must fall anyways, and if I didn't fall right there, I must fall into the mōre-rain in front, so I dropped my axe, and then dropped myself.'

We had brought up a large tent, and we used it as a counterpane—that is to say, we lay upon the ground, and covered ourselves over with the tent. This is by far the warmest method of sleeping.

Next morning, August 2, we had a final swear at the kerosene humbug, and left our sleeping-place at 4.40. We kept going until we arrived at the lip of the crater. No difficulty—simply grind, grind, grind, over rocks of loose shale and slate. We kept along the edge of the arête the whole way. Near the top we found a few stray boulders of conglomerate, and a little higher up some rocks of sandstone, to climb which we deviated from our straight course. We could not neglect one of the few bits of real climbing which we were likely to get. At 7.10 we gained the edge of the crater by means of a short 'chimney.' Here we halted ten minutes to sketch, and then continued along the brink to the summit of the arête which we had ascended on July 30. On the side of the crater upon which we were, snow-fields descend into the crater itself, at the bottom of which is

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nothing but snow and ice. The opposite side consists of steep rocks from 2,000 to 3,000 feet high.

Every here and there upon these rocks are small glaciers, splashed, as it were, upon them, and apparently fed from nowhere. They look ready to tumble at any moment into the crater. These overhanging glaciers are characteristic of the neighbourhood. There they are—right on the rocks with yawning crevasses perhaps upon them, or broken up, and ready to topple over upon you—but why they should be there, or what they are doing, is a mystery. They hang quite unconnected with any snow fields above. Perhaps in another few years they may have melted entirely away. The summit of St. Elias seen from where we were appeared quite close—just over the upper lip of the crater. This upper lip, which is to the north, is 2,000 feet higher than the southern and lower lip on which we were. To get on to the upper lip we bore across snow fields and up to some schrunds, which threw us somewhat out of our track. Then, when the snow above the highest of these schrunds became sufficiently steep to necessitate step-cutting, we left it for the shale to our right. This shale was very steep, and slipped downwards at every step. It continued up for over a thousand feet. To the right of it was some steep snow leading up to the top of the crater's lip, but it was in too dangerous a condition for climbing. Above the shale are some fine rocks of grey sandstone. These afforded us the second and last bit of rock climbing which we obtained upon St. Elias. Having surmounted these we found all above them steep snow connecting with the couloir to our right. Ten minutes we thought would suffice to get up it, and then we should be upon the upper lip; so we rested awhile for luncheon, and for the purpose of ascertaining the height, which we found by boiling-point thermometer to be 9,990 feet.

After lunch we got on to the snow, and found to our disgust that we should have to cut steps the whole way up, and to traverse the top of the couloir. That on which we were could hardly be called snow. It consisted of grains as large as small peas, quite unhomogeneous, and frozen. Ice was within an inch of the surface, and all was commencing to melt under the heat of the sun. Small slides of snow were continually on the move around us. Near the top the slope was very steep, and there were three small ledges within the last thirty feet. Up here the granular snow was nearly a foot deep, and we had to cut through it to get at the ice beneath. The steps were cut so far apart that we had to kneel in them

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first in order to raise ourselves into them. Just at the top we had to take the greatest care, for here there was no ice into which to cut. My brother was in a state of rebellion at the distance he had to stretch from step to step. 'His legs were 'made on a different model from mine,' he said. 'He did 'not possess the reach of long compasses.' However, we got up safely, having taken an hour to do the 175 feet.

On the top we found snow fields stretching around the brim of the crater, with a gradual rise all the time, but with many depressions. These depressions, with their accompanying elevations, were most trying. The snow was very soft, sometimes above our knees; but whenever the grade became at all steep there we found ice close to the surface. Several large crevasses separated some of the elevations from the snow below, and these we had to turn. During one of these turns down over the lip of the crater we passed by a curious cone of rock, in shape like a sugar loaf, and composed of bits of rock, small and of various shapes, but all fitting into each other like mosaic work or a patchwork quilt, and all with flat even surfaces. The cone was about eighty feet high, and forty wide at the base. Williams said that it resembled the volcanic cones of lava which he had seen at Kilauea, in the island of Hawaii. We continued round the brink until we were about due north of the crater—that is to say, we had come more than half way round it. Here we halted to discuss what had better be done. The conviction had been gaining on us as we neared the final peak that we were not destined to reach the summit.

The position of the place where we were was this. To the north was the final peak, with its great western shoulder, to which is connected a magnificent wall of rock rising some 6,000 feet above the Tyndall Glacier. From this wall we were separated by one of the feeders of the Tyndall Glacier. South of us was the crater, and east of us was that part of the upper lip of the crater which rises far higher than any other part. Seen from some places this high upper lip appears as a peak in itself, separated from the final peak of St. Elias by a gap. We were above this gap, but could not see into it. We studied the final peak of Elias closely, considering whether we could sleep out where we were, and continue the ascent on the morrow. But we gave up the idea. We had no blankets, the snow was in bad condition, and a wind was rising.

We estimated the summit to be 6,000 feet above us, but I think now that we were 2,000 feet under the mark. Our

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present height was 11,461 feet. We could see that some parts of the ascent would be easy, but that others would be extremely difficult—at least to our party. On the further side of the gap the climber would have first to travel eastwards to avoid an overhanging glacier. He would then climb over rocks and snow to some green ice. At about 1,200 feet above the gap he would come to some comparatively level snow slopes. The route would then be up steep snow and rocks to the edge of what may be called the southern arête of the mountain. This arête runs down from the summit for about 4,000 feet, and there stops. It is not steep, and no difficulty need be apprehended either upon it or upon the east face of the summit itself, unless, indeed, and this is not at all improbable, most of what appears to be snow is in reality ice. Lower down we distinctly saw ice, and it was this which chiefly deterred us from venturing further.

The face of the mountain to the left of the arête, or in other words, the south-west face, is utterly unclimbable. The snow upon which we were travelling is seen from below as a snow-wall fringing the brink of the crater. To the north this snow falls away rapidly to a glacier which runs west and connects with the Tyndall Glacier above its big ice-fall.

From what we could judge during our three weeks' examination of the mountain, we are inclined to think that the next attempt should be made from the north. The mountains all around seem to have on their northern sides more or less gentle snow slopes, whilst the southern sides are of steep rock and glacier. After our return to Yakatat, we were told by George, the second chief, that he and others had seen the northern side of St. Elias, and that it was covered with snow, and was very much less steep than the southern sides. From down upon the Guyot and Tyndall Glaciers the huge wall of rock to the west of St. Elias appears to block all approach to the north of the peak ; but from where we were to-day, and from the top of the arête of July 30, we could see very distinctly that there exists a low pass from the head of the Tyndall Glacier to a glacier on the other side of the wall. This glacier we believe to be part of the Guyot. The pass I speak of lies at the end of the wall of rock, and separates it from a range of hills lying between the Guyot and Tyndall Glaciers. The glacier on the further sides flows around from the north of the big wall.

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The panorama we obtained was very wonderful. The distances were immense. Everything was ice or rock. Wherever mountains were absent, flat glaciers were present, stretching far, far away to the horizon, except at one place only, at the mouth of the Yahtsétäh river, and there the sea was substituted for ice. There were many ranges of mountains away to the west, but they were mostly low (6,000–7,000 feet). The Malaspina plateau (*i.e.* the Agassiz Glacier) appeared with its moraines like a huge race course, and the streaks of *débris* at the west end of the course had fashioned themselves into Saturn's rings. The greater portion of this glacier, and certainly nine-tenths of the white ice, comes from between St. Elias and Cook. From the south of St. Elias there comes nothing but ice covered with *débris*. The Tyndall Glacier, again, forms a very small part of the Guyot, but most of the moraine upon the latter descends from the southern slopes of St. Elias by means of the former. The Guyot stretches away out of sight west of the Yahtsétäh river, its central moraine coiling along like a huge snake.

The chief feature, however, in the landscape was undoubtedly the huge rock wall to the north-west. Nothing can be finer than this. It must extend for several miles, while, springing from glaciers, it towers up perpendicularly to a height of 10,000–11,000 feet, of which perhaps 6,000 is above the ice. The summit is broken by several fine peaks, one of which is certainly the most beautiful peak of the district. It is formed, as is also the wall from which it springs, of precipitous rock, very dark, and has just a fringe of snow along the top edge.

The Chaix hills are in the shape of a broad and are quite apart from St. Elias. At the angle of the there are snow-fields connecting with a short range of hills of reddish sandstone. They run N.N.W., and form a ridge between St. Elias and the Chaix hills. The latter are of grey sandstone; so we have first grey sandstone, then the reddish sandstone, and then St. Elias with its filthy shale and slate. This shale and loose slate spoilt most of the charm of our climb. During our descent to camp along the arête we dislodged so much of the stuff and sent it tumbling away in such clouds of dust that the last man at times could hardly see to walk.

Just at the left of that arête there is a gully from which a cloud of dust is always rising, due to falling stones. When we first came within sight of this phenomenon we were of

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opinion that we had found hot springs. We examined the gully carefully through a telescope, and remained of the same opinion, nor did we alter it until we had arrived close to the gully itself. The column of dust is always present —it never ceases. The wind plays upon it as it rises, just as the wind plays upon the Staubbach and other waterfalls, wafting the spray to and fro. The dust rises to a height of more than 2,000 feet, and from a distance causes the gully to appear grey against its darker surroundings.

There is nothing much to say of the descent. The place which we had found worst upon the ascent proved considerably worse to descend. The steps which we had made were partially melted away and had to be re-cut. The flag which had been given us at Sitka we had carried with us as high as we had gone, but as we had found no suitable place in which to place it, we had brought it down again, and we now left it upon the sandstone rocks just below the edge of the crater. It reposes in a vaseline jar inside a meat can beneath a small pile of stones. At 9 P.M. we were back at our sleeping place, and early next morning descended to Hoof Camp, and then to the camp at Coal Glacier. Our food supply was nearly exhausted, so we packed down next day to Goose Camp, where we were met by the men from the beach, who brought with them an ample supply. 'Shorty,' who had been suffering for some days from sore feet and a sprained ankle, almost gave out whilst descending the Tyndall Glacier, so we gave him a day's rest before starting for the shore. Our men had found a better route down to the river, all on the Guyot Glacier, and this we followed. As we passed a lake above Castani, which had been full when we had ascended, we noticed that it was empty, and our men told us that they had found the waters of the Yahtsétäh much deeper on their journey up, and that lake Castani was quite dry. The night before last we, at Goose Point, had heard a rushing sound as of wind through rocks. This, then, was the cause. The lake had burst its bonds, had swamped Castani, which in turn had broken loose, and the water had rushed down to the river and had caused that to rise.

At the place where the river issues from beneath the ice I stayed behind to get a photograph. The others went on along the new route which took them down by the river. Ignorant of this I lost considerable time in trying to find them upon the glacier above, and eventually had to force a way through the thick bush down towards the river, near which I found 'Shorty,' who had been unable to keep up with

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the others. A little unwell to-day, and wearied with my hot and trying *détour*, I cursed the last mile or two of that march. I seemed to stumble over every stone and to trip over every bush. My camera always got upon the opposite side of the tree which I was trying to pass. I walked right into a big hornets' nest, and was stung upon the hand and forehead, the pain being so great that I flung down camera, ice-axe, and pack, and fled with a horrible yell from the spot. Then, when I had recovered myself, I had to recover my possessions, which had fallen upon the hornets' nest, and I had to crawl up gingerly to the spot and take them surreptitiously, without disturbance to the insects. 'Shorty' then advised wading the river — he said it was preferable to hornets — so we descended, and were for the next half hour alternately wading up to the hips and crossing mud flats. Even when we had got to camp there was no peace, for the mosquitoes and flies prevented us from sleeping.

Next day we descended to the shore by a slightly different route. It was shorter, but entailed wading up to our chests at one place. It was near here that the men requested me to photograph the party in the water. I found some difficulty in arranging the camera, the legs of which kept sinking deeper and deeper into the quicksands. After exposing one or two plates, I tried to shift my position, but I could not move; my own legs had also sunk, and the broad welts of my boots prevented me from freeing myself. I had to call for assistance, and was dug out.

When we got to the strawberry patch the same scene took place as upon the previous occasion.

Then came the weary walk along the beach to our first camp. The sea was smooth, and we resolved not to trust the weather too far, but to get away whilst we could, so we collected our goods, ran the canoes down the beach, and got out to sea through the surf without shipping any water. By alternate rowing and sailing all night we reached Yakatat the following morning. The men were tired out. The last thirty hours had been very trying. We paddled across to the mainland and pitched camp, intending to remain there awaiting the arrival of the 'Alpha' in preference to staying at Yakatat, where we should be exposed to continual visits from filthy children and dogs. A small cutter was on the point of sailing south with a few miners on board. Williams managed to get away upon it, and very lucky he was, as we others had to stay where we were, waiting and waiting for the 'Alpha,' which never came. We had but very little left

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of our provisions, and for five weeks we were mainly dependent for sustenance upon bad fish and clams. At the end of two weeks Broke, 'Shorty,' and Lyons went down to Sitka with some Indians in a canoe, and had rather a rough experience. They heard at Sitka that the 'Alpha' had sailed from that port some weeks previously. The conclusion, therefore, was that she had gone to the bottom. Broke therefore chartered a schooner of 140 tons, which happened most fortunately to be at Sitka, and sent her up to fetch us. There was great joy when we saw her arrive at Yakatat, but our troubles were not yet over. The weather, which up to now had been perfect, changed, and easterly gales set in. Nevertheless, we started out to sea, but, after battling against wind and waves for five days, we sprung a bad leak, which could not be stopped, and were obliged to hurry back to Yakatat, the pumps going all the time, and several feet of water in the hold. The vessel was beached and repaired, and at the end of ten days we again set sail. This time we were in luck, for we just managed to arrive at Sitka before another easterly gale arose. At Sitka we had been given up as lost, and we were therefore warmly welcomed back.

And so ended our expedition. We had not succeeded in gaining our summit, but we had had plenty of adventure in a small way, and had met with no mishaps.

One last word. The next expedition from Sitka ought to be independent of canoes, and of the miserable and unsafe vessels which are the only craft available in Alaska. It ought to go up coast in a seaworthy and reliable ship, and not to run the risk of shipwreck or of having to winter at Yakatat. It may be that canoes are best for landing through the surf, but these can be taken up for the purpose.

Perhaps a few words should be added about the desirability of taking Swiss guides. The summer of 1888 was most exceptionally hot in Alaska. Where we found ice there would probably be snow another year. The condition of the mountain, as we found it, was such that I do not believe it could have been ascended, even with guides. I believe that step-cutting would have been necessary for several thousand feet above the point we reached. As regards porters, the Indians will carry 70 or 80 lbs. a day over rough ground, but they cannot climb.

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Dauphiné in 1888.

By W. ASBURY GREENE.

As one can now get to and stay in Dauphiné with so much more comfort than in former days, it is surprising to find that travellers there are still so few and far between. So few, indeed, are they, that M. Tairraz, the manager of the Chalet Hôtel at La Bérarde, is often nearly alone in his thoroughly clean and comfortable inn, which was only opened in 1887. Further publicity may, perhaps, draw more travellers to Dauphiné, and that is the only excuse for the present paper, contributed by one whose scanty knowledge of the district in no way qualifies him to write on the subject, and who would not have presumed to do so were it not at the suggestion of, and, it may even be said, under pressure from, our Editor.

Besides the attraction of comfortable quarters, another advantage which visitors to Dauphiné now enjoy is the excellent guide-book compiled by Messrs. Coolidge, Duhamel, and Perrin. I must confess that it gave me for the first time an idea of the immense amount of work that can be done in the district, which I had before hazily associated with the names of the Meije, Ecrins, and Pelvoux, and with little, if anything, more. It is an indispensable companion for the mountaineer, and, when the long-promised maps by M. Duhamel are forthcoming, its value will be greater still.

Guide-book and Chalet Hôtel combined were the inducements which led Mr. F. C. Mills and myself to turn our steps towards Dauphiné in the autumn of 1888. We started with some misgivings, for we were unable to leave London before the end of August, and the fact that by far the greater number of ascents have been made in July or the early days of August seemed to indicate that the Dauphiné mountains go better early in the season than later. As a matter of fact, however, there seems to be no reason why mountaineering in September should not be as feasible in Dauphiné as elsewhere.

We left England on August 25, 1888, and travelled through Paris, *viâ* Chambéry, to Grenoble, which we reached next morning in time to secure places on the midday diligence to Bourg-d'Oisans. It may be useful to caution travellers that it is made noon in the town half an hour sooner than at the railway station, and that the diligence starts by the local time. After leaving Grenoble, the diligence runs

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for several miles along an excellent road—in terribly straight lines, however—through a double avenue of plane trees, parallel with the Drac, until a short distance before Vizille. From Vizille the valley of the Romanche is followed, and the road mounts steeply in places. Hence, although the diligence is liberally horsed, the pace is slow, and it takes over six hours to cover the distance between Grenoble and Bourg-d'Oisans—some thirty miles only. I regret that I can say nothing as to the scenery, for the weather, both as we went and returned, was thick, and the clouds hung low on the hills. At Bourg-d'Oisans we were heartily glad to quit the diligence and find ourselves in comfortable quarters at the Hôtel de Milan. Here we were on the threshold of the mountain district, close to the junction of the Venéon Valley with that of the Romanche. La Bérarde lies near the head of the former valley, and forms the natural and most convenient headquarters for climbers.

Next morning, upon our host's advice, we took a carriage to Vénosc, near which place the *char*-road ends for practical purposes (though it continues in name as far as the Plan du Lac), and there transferred our modest baggage to a mule. The path leads through a wilderness of rocks to the village of St. Christophe, then rises steeply, and again descends abruptly to the level of the torrent, turning to the left past the village of Les Etages, and passing through a small wood of birch trees, lopped and clipped out of all natural shape, but still refreshing to the eye after miles of treeless waste, till at last the foaming Venéon is crossed and La Bérarde is reached. The little inn, with its square whitewashed walls and painfully neat appearance, is a hideous blot on the landscape—there is no denying it; but one will cheerfully forgive the unpicturesqueness of the outside for the sake of the thorough cleanliness and homely comfort of the interior arrangements. Here we had the pleasure of meeting an accomplished lady-climber, whose doings in Savoy and Dauphiné were recorded in the November number of the 'Journal,' and made arrangements to take on from her the chief guide of the district—Gaspard père. Meanwhile we engaged J. B. Rodier, and were well satisfied with him. He is a cheerful, good-natured fellow, and possesses a very fair knowledge of the mountains. As, however, in many other districts, where the guides have gained their mountain-craft from solitary experience as *chasseurs* rather than from professional guiding, those of Dauphiné have an aversion to snow and ice, which often causes them to make a tedious *détour* over smooth and

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awkward rocks rather than commit themselves to a convenient snow couloir which an Oberland guide would hail with delight.

Mills, who had spent a week in the Lake district, was bent upon starting at once with a 'grande course,' and, contrary to my principles, which enjoin gradual training, I was weak enough to consent to start next morning for Le Plaret, a peak of 11,700 feet. The result was that, not far above the iron cross which marks the spot where M. Cordier was lost after making the first ascent of the mountain, I had a severe attack of mountain sickness, and elected to remain behind. The cause of mountain sickness has been the subject of a good deal of discussion of late, but in this case, at any rate, it clearly arose from want of condition and training. Mills duly reached the summit in about six hours from the start, and came back full of surprise and delight at the beauty of the view, the number and variety of the peaks, and especially the mixture of rock and snow which seemed to promise most interesting climbs in every direction.

Next day (the 29th) we strolled up the Tête de la Maye, the Rigi of the district, from which we had magnificent views of the Meije, Ecrins, Ailefroide, and other giants of the neighbourhood, took some photographs, and then clambered up slopes of *débris* and rocks to the Roche Blanche, whence a still more extended view is gained.

At 4.45 on the morning of the 30th we started with Rodier and Christophe Turc as porter for La Grave by the Brèche de la Meije. The way lies up the Vallon des Étançons, a wild waste of stones containing but one isolated patch of verdure, on which is a hut occupied just now by Provençal shepherds, who, having no pasture at all at home, bring their flocks great distances to munch the few blades of stunted grass which Dauphiné affords. The morning was brilliantly fine, and, as we mounted the snowslopes below the Meije, we had an excellent opportunity of studying its forbidding cliffs. There was a glorious view to the south from the top of the pass, but to the north-west, over the Grandes Rousses, heavy clouds were gathering and driving fast down upon us. So, after a short stay, we made quick work of the snowslopes which separated us from the Enfetchores rocks, down which we scrambled, and in pouring rain raced over the alps to La Grave, which we reached at 1.30 P.M.

Clouds filled the valley the rest of that day, and in most unpromising weather we started on the afternoon of the 31st for the Refuge de l'Alpe du Villard d'Arêne. In a thick mist

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we reached the refuge, formerly an outbuilding belonging to some deserted mining works, and, having converted a barrow, used at one time in connection with the aforesaid works, into a cheery fire, passed as jovial an evening as surrounding circumstances would permit. Next morning we were off at 3.15 in weather which would have puzzled even the official forecaster, for everything was wrapped in dense fog. We hoped to make the ascent of the Grande Ruine, but expected to be obliged to make La Bérarde by the easiest available pass. Never was doubtful lantern light more uncertain, or foothold more difficult to make out, as we wended our way through the fog and a chaos of rocks and stones; nor, on the other hand, was ever the feeble dawn more welcome as it struggled late through the mist, and showed us the Glacier de la Plate des Agneaux just ahead of us. As we munched a second breakfast in the grey dawn, it was cheeringly evident that the rising sun was making headway against the clouds, and when we had mounted a long and monotonous series of shattered rocks and *débris*, and reached the upper *névé* of the glacier, the sun fairly shone out. We now made for the Brèche Giraud-Lézin, from which, after about an hour's step-cutting, the central summit of the Grande Ruine was attained. The view was limited, a few summits only appearing above a sea of cloud, Les Ecrins dominating all. We descended after a short halt, and then made for the Col de la Casse Déserte. The glacier on the other side was a good deal crevassed, and gave some trouble, but only too soon we were on the stones, through and over which we descended to the Vallon des Etançons, reaching the inn at 3.30 P.M., just as a heavy snowstorm began. We found ourselves the only guests, but our kindly host soon had blazing fires in the *salon* and *salle à manger*, and very welcome they were, for the snow fell all the evening, and it was bitterly cold outside.

The next day (Sunday) the sun shone out gloriously, and the new snow disappeared fast, but it was with some doubts that we accepted Gaspard's positive assurance that the south face of the Meije would be in excellent order for to-morrow.

At 12.45 A.M. on September 3 we were again en route up the Vallon des Etançons in bright starlight. When we reached the Refuge du Chatelleret it was decided that it would be better to give the sun an opportunity of clearing the rocks of *verglas*, so we had a liberal forty winks on the straw, and started again at 4.45, reaching the promontory at 6.30. The rocks were still a good deal glazed, and in sheltered

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places there was fresh snow still, but an unclouded sun was doing good work for us, and at 12.45 we were enjoying a perfect view from the top of the Meije, after six hours' continuously stiff climbing. The short half-hour we allowed ourselves quickly passed, and about five hours' steady work placed us again on the glacier at the foot of the promontory. It was then getting dusk, and was quite dark by the time we reached the Refuge, where our lanterns had been left in the morning. After a good meal and some hasty repairs to clothing, which had been rudely handled by the rocks, we scrambled over the stones and through the torrents of the Etançons valley, and reached our inn again at 9.45.

Next day, September 4, clouds filled the valley, and rain soon began and continued with brief intervals all day. After much conference with Papa Gaspard, a snow tramp up the Rouies was decided on for to-morrow, should the weather improve.

A cloudless morning greeted us, and at 5.15 we were off up the left bank of the Venéon, and at eight halted for breakfast on some rocks overlooking the Chardon Glacier. Mills had started unwell, and, not feeling better, returned with Rodier. Gaspard and I trudged up the glacier in deep new snow, encountering a fierce wind on the plateau, from which the snowy dome of the Rouies rises. By noon, when we reached the top, after plenty of step-cutting exercise for Gaspard, the wind had almost died away, and we had a glorious view of clouds rolling up from the south, revealing every now and then lovely glimpses of the Val Gaudemar lying deep below us, whilst to the north and east the sky was quite clear. We had left the provisions below, but pipes and some wonderful chamois stories from Gaspard whiled away an hour pleasantly, and at 5 P.M. we were back at La Bérarde. Les Ecrins was our object for next day, the start to be made at 2 A.M., but at that time the weather was execrable, and all we could do was to make a damp excursion to prospect a route up the Rocher de l'Encula from the east.

Next morning (the 7th) with the addition of Mr. F. Baker Gabb, who had turned up at La Bérarde, we set out to complete the new route, and reached the summit of the Rocher (as mentioned in the 'Journal' of November last, p. 146) without serious difficulty, but somewhat hampered by a driving snowstorm, which began about half an hour below the top, and lasted the rest of the day.

A spell of bad weather followed, with almost incessant rain. During this time our little company was strengthened

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by Messrs. Coolidge and Gardiner and a luckless French family, who came up from Grenoble in the rain, went next day part of the way up the Tête de la Maye in a thick mist, and then trudged back down the valley in a hopeless downpour.

At 6 A.M. on the 11th we all left La Bérarde—a caravan of ten travellers, guides, and porters—for Vallouise by the Col de la Temple, and, after we had risen above the clouds which filled the valley, got a grand view of the Pelvoux precipices from the top of the pass. We parted from Messrs. Coolidge and Gardiner at the Chalets d'Ailefroide, having decided to sleep there and attempt the Pelvoux next day.

After a lively night, chiefly spent in contending with swarms of starving fleas, we got off at 3.30 A.M. in anything but encouraging weather. As we made our way up the Celce Nière valley the rain fell, and our hopes also, but, by the time we reached the ruinous Refuge Puiseux, matters had greatly improved, and near the Refuge de Provence there was sufficient sun to produce a vividly-coloured fogbow.

Gaspard altogether declined Mr. Tuckett's couloir, and we mounted the interminable rocks by the old route, but the new snow and a violent wind made progress slow, so that it was not till 1 P.M. that we reached the top. Owing to the bitterly cold wind, we had to hurry off after a hasty glance at the grand and extensive view which was suggested, rather than patent, to us, and at 4.50 resumed our knapsacks at the Refuge Puiseux and marched down to Vallouise, which we reached soon after 7 P.M. Between the Chalets d'Ailefroide and Les Claux the path runs through charming woodland scenery, which seemed a positive refreshment to the senses, chilled by the austerity of the stony wilds which we had hitherto learned to associate with the Dauphiné district.

Next morning the rain fell heavily, held up for a short time in the afternoon, and then came down again in torrents, which lasted until five o'clock on the following morning, when we started on the way back to La Bérarde by the Col de l'Ailefroide. The Col de la Pilatte, which we intended to have taken, was given up in deference to the weather. In the sudden way which was a peculiar feature of the autumn of 1888, the clouds cleared away, and it was a brilliant sunny morning when we halted for breakfast in the charming woods near the Chalets d'Ailefroide. The fresh snow was very soft and deep as we ploughed our way to the top of the pass, and it made the rotten rocks on the further side difficult to manage. Then the brief spell of fine weather was exhausted,

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and we got back to our head-quarters with wet jackets at 7 P.M., again finding ourselves the sole occupants of the inn.

The following day (the 15th) Gabb left for La Grave, Mills went with Gaspard and Rodier to the Tête du Rouget, and I remounted the Vallon des Etançons to get some photographs of the Meije. Mills had a successful day on the Rouget, which he strongly recommends as a good rock climb. Ascending the grass slopes between La Bérarde and Les Etages, he mounted a large couloir of rock leading to the ridge somewhat east of the summit. This was very rotten, narrow, and in places difficult. The ridge had to be followed, and the summit, which looked quite close, seemed to get further off, and was only reached after several descents and ascents over intermediate ridges. The rocks positively glistened with mica and lead, which appeared a deep blue in the red rock for which the mountain is conspicuous. The descent was made by a steep snow couloir to the Soreiller basin, in full view of the crater-like Tête du Soreiller, and with a remarkably sharp aiguille called Pain de Sucre straight in front. The path then descended by the side of or high above the stream, among edelweiss of very large size, and in the greatest luxuriance, and came out close above Les Etages.

The 16th (Sunday) was fine, and we arranged to pass the night at the Refuge du Carrelet, and attack the Ecrins on Monday from the south and descend by the north face. As we set out for the hut, the clouds, which had settled down upon the mountain tops, were coloured gloriously by the setting sun. The Tête du Rouget seemed ablaze, and the grand conflagration threw ruddy flames high into the sky. The snows of the Pic d'Ailefroide blushed a deep rose colour. The effect was too wild and grand to be reassuring to those who were depending upon fine weather for the morrow, and, as we settled for the night in the comfortable Carrelet hut, it was with but slender hopes of completing the expedition.

The morning, however, was clear, but the stars shone only too brightly, and the air was constantly quivering with faint lightning. We got off at 2.30 and kept up steep slopes covered with dwarf firs, and afterwards over moraine, till we reached the point where it was necessary to take to the glacier, and here we shivered for an hour waiting for daylight. Resuming the march, we reached the Col des Avalanches at 7.15, and emerged into sunshine and breakfasted. Thence we climbed by rocks affording interesting

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work, but doubtfully simplified in the most difficult place by a long wire rope, the slackness of which is apt to disturb the foothold—and the temper; afterwards up the steep little Glacier des Ecrins, and, as we began the last barrier of rocks below the summit, a thunderstorm, which had been growling in the distance, burst upon us with an accompaniment of blinding showers of hail, through which we scrambled to the top. No chance of a view being possible, we immediately turned to descend the steep snowslopes on the north face. Hail, or rather granulated snow, filled our eyes and ears, forced its way down our collars and up our sleeves as we floundered down to the bergschrund, over which we tumbled ungracefully at the narrowest place we could find, and then the storm cleared off for a time, only to come on again with increased vigour when we reached the Col des Ecrins. The guides voted the convenient though steep snow-couloir unsafe, and we had therefore a very uncomfortable hour on the rocks, every cranny of which was filled with melting snow and hail, raced over the Glacier de la Bonne Pierre, then along the crests of a series of moraines and so on to steep slopes of the worst and most treacherous stones I ever came across. Bonne Pierre indeed! An epithet of a very different kind would be more appropriate, and I fear was extensively employed as we tumbled along at the double. After sundry somersaults on my own part, I am grieved to say my moral nature had become so deteriorated that I positively rejoiced to see the great Gaspard himself pitched clean into the air and land in the bed of a torrent whilst his axe went hurtling through the rocks yards ahead of him. Then we reached the *gazon*, sat down in the wet, and ate bilberries, and finally reached La Bérarde at 5.30.

Next day we bade adieu to our excellent host, hostess, and handmaiden, said a cordial farewell to Gaspard and Rodier, and retreated down the valley homewards.

In conclusion, I would strongly recommend those who have not yet visited Dauphiné to do so. They will find plenty of excellent climbing of a varied kind. There are even still some virgin peaks, and many new routes to be done. As to creature comforts, M. Tairraz is an excellent cook and thoroughly understands how to make his guests comfortable, whilst civilisation has not yet so far advanced as to interfere with the free power and right of the visitor to do as he pleases. In many respects the natural features of the country differ widely from those of Switzerland, and, though one would, no doubt, give the preference to the softer beauties

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of the Swiss valleys, the stony wastes of Dauphiné have an impressive grandeur of their own which is unequalled further north.

The Ascent of Mjölnir and the Exploration of the Gjegnalund Glaciers in Norway.

By CHARLES HOPKINSON and WM. CECIL SLINGSBY.

(Read before the Alpine Club, April 10, 1888.)

IN the summer of 1884 a new sheet of the Amtskarter, or Ordnance survey maps of Norway, was issued, and revealed, or suggested, the presence of a large snow-field about 17 miles long, and 4 to 6 miles broad, between the Förde and Nord Fjords, and west of the usual route from Vadheim to Faleide. On the map no great difference in height is indicated. At the east, a fine peak, Gjegnalund, rises with grand northern precipices to a height of about 5,600 feet. Slingsby had often noticed this mountain, but had no idea that its surroundings were so fine, as a glance at the map suggested. West, the snow-field, which seemed to vary from 4,000 to 5,300 feet, terminates in two peaks, Kjeipen and Hjelmen (The Rowlocks and The Helm), whose steep precipices face the storms of the Atlantic.

In the geological map this region is very conspicuous, as it forms the only important break in the continuity of the great mass of gneiss and metamorphic rock which stretches from the Sogne Fjord far past Romsdal. From the coast to the Hye Fjord the characteristic formations are sandstones and conglomerates classed as 'Siluriske,' which lie in massive layers, best seen in the cliffs of Skjærdal, and form a striking series of terraces on the upper fjeld. In Skjærdal also are remarkable examples of conglomerate, where small white and red granite boulders are aggregated into large secondary boulders, and are as clean and round as if they had only just been raised out of the sea.

In 1885 we agreed to take a short autumnal tour in Norway, in order to explore this snow-field, to try to climb some unascended peaks in Söndmöre, and, better than all, to attempt the conquest of Mjölnir, a peak in the Romsdal district, which we had every reason to expect would prove to be an exceedingly difficult rock climb.

On September 4 we were joined at Florö by Lars Janssen, a handsome man who had just returned from a short campaign with Mr. Russell Starr. The previous year he had

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made two capital expeditions with Messrs. W. C. Slingsby and W. Ecroyd. Lars is a good type of a race of men descended from the old sea-kings, and has himself many a thrilling adventure, experienced during winter fishing at the Lofoten Islands, with which to beguile the easier hours of travel. He was to act as guide, porter, or companion, as the case required.

The captain of the little steamboat 'Voss' most obligingly steamed some 12 miles out of his course to deposit us at the mouth of Nord Gulen Fjord. Before leaving steamer-comforts we provided ourselves with a long and substantial loaf, affectionately dubbed 'the baby.' Whilst waiting for a boat we watched a withered dame decapitating and cleaning herrings. Though in all probability we were the first foreigners who had visited her little cove, she was not in the least surprised to see us. The Norsk folk, though innocently inquisitive, rarely show surprise.

The evening row to the little hamlet of Rise was delightful. Nature's picture, wet as if fresh from her easel, showed her wondrous powers as a colourist. The richness and softness of the evening glow on the mountains, from rose red to deep purple, the contrast of the dark pines and silvery birches in the forest fringe, the golden yellow of the ripening corn, the vivid mosses and the tranquil greys and blues of the fjord, were beyond the art of pen or brush to portray.

On our arrival at Rise we found that a recent increase of population prevented our stopping where we had expected to do, but fortunately a woman who had travelled in our boat with us hospitably offered to accommodate us. We were provided with separate beds, occupied, alas! by thirsty armies.

Soon after 3 o'clock next morning we were rowing in the twilight up the Rise Vand, a lake about 3½ miles long, and headed by the two mountains Hjelmen and Kjeipen. We intended to climb the latter, and, if possible, to traverse the great snow-field over a white dome about 5,300 feet high, and to descend to Strömsbotten Hej sæter, which is about 520 feet above sea level. The distance from Rise to this sæter, as the crow flies, is only about 16 miles, and, if the map had been correct, we could easily have succeeded. Next day we intended to reascend to the snow-field by a wild gully, well shown on the map, and make a glacier pass to Fördedal, or to West Öksendal, and, for the third day, we had set apart the ascent of Gjegnalund and the exploration of Skjærdal. Our failure or success forms the first subject of this paper.

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Leaving the boat, we toiled up the woody slopes on the left, where the honeysuckle filled the air with fragrance. The morning sun was hot and our knapsacks heavy, so that an occasional pause, to glance at the perfect reflections in the lake behind, was welcome. We cleared the woods at 6.10, and turned well to our right across a peat bog, in which Bruin had been having his morning tub and a red deer had left his foot-marks. The bear's route was ours for nearly a mile, and, after it diverged, we commenced our attack on the successive rock faces. At 9.20 the last escarpment was behind us, and a pretty peak, up which a snow slope offered an easy route, stood before us. We had had a magnificent climb, and for at least 2,000 feet we were on rocks where hand-climbing was necessary. It was a capital beginning, and each had gained confidence in his fellows.

The view was magnificent, and embraced the jagged Söndmöre peaks (North), the vast Justedalsbræ with its subtle curves and snowy domes (East), and the open sea and many fjords, with the precipitous Hornelen (West). Hornelen calls to mind the earliest and the greatest climbing feat recorded in Norway—Olaf Trygvessön's rescue of one of his followers, who, more daring and less discreet than his companions, had climbed to a place where he could not get up and dared not come down. Olaf rose to the occasion, scaled the cliff, and tucking the crag-fast warrior under his arm carried him down again.

The tract of fjeld and bræ before us was very remarkable. The cliffs and terraces which had marked the ascent, continued eastward in serried array. We could count in succession fourteen, most of them with small tarns on the terraces, each of which dipped towards the next cliff east.

We soon set off again eastwards along the ridge of the snow-field, and manfully resisted the temptation to climb a fine crag which we passed on our left. Beyond it, we turned north through a break in a rocky ridge, and passed close under a most remarkable tower of rock some 300 feet high. It is entirely cut off from an adjacent ridge by a deep gap and an overhanging precipice. We skirted this rock and its neighbour through deep snow, aiming for a glacier slope which rose to the ridge. On nearing this, we saw that the crevasses were many and deep, so we looked about for a quicker route. The cliffs to our right, though difficult, were practicable, if we could once get on to the rock. The ledges, though narrow and smooth, offered good hold. The long-legged members of the party, having found a narrow

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place, had a great advantage in crossing the bergschrund, which was deep. A stride, even if long, gives a steadier pitch and is less sensational than a jump, over blue depths, on to a narrow ledge. Above the rocks, an easy slope led to the top of a small peak, Tremœndstind, where we built a cairn. Though lower than Kjeipen, this peak affords a better point for criticising the Amtskart, which is feeble, save in imagination. To our great surprise, we saw immediately in front of us a deep depression, and a series of tarns not even imagined by the map maker.

Above the tarns a rampart of high cliffs sprung up, and upon the top of them, in the distance, we saw the snow dome which we had intended to cross. We gave up the idea of crossing the snow-field and decided to try and skirt the mountain-side as far as possible above Gröndals sæter. Leaving Tremœndstind at 12.35 we rapidly descended over easy rocks, and at 2.15 halted by one of the characteristic tarns for our frugal 'middag.' We had one of the wildest views in Norway. The great feature was a large lake, Storebotten Vand, from which the precipices rose, without a shore, to a great height.

We climbed a cliff and turned southwards on the terrace just below the high rampart. Our terrace gradually narrowed to the typical ledge, with a perpendicular wall both above and below, so often imagined by the valley tourist, but so seldom found by the mountaineer. This one, however, just served our purpose, as it emerged on to a steep grassy slope, at the foot of which, far below us, was Gröndals sæter. Having still three hours of daylight we determined to push on for Strömsbotten Hej sæter, and worked eastwards, until we saw a little lake about 2,000 feet below us. The lake was of rich turquoise blue, and with its setting of vivid grass and dark pine forest made a striking picture. Beyond this lake, four miles away, we saw the col leading into the valley, where our intended sæter is situated. The direct way was down by the shores of the lake. As we did not relish the notion of going down 2,000 feet merely to re-ascend the same height beyond, we sought an alternative. We could not follow a contour line on account of impracticable precipices, so, though we were all fagged, and daylight was fading away, we turned upwards towards the snow-field. We soon came upon some difficult rocks, where Lars climbed brilliantly. In one awkward place he shoved Slingsby up and then climbed up nimbly himself without help.

Beyond the rocks, we reached a small glacier arm, which

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we crossed with some care and step-cutting. The pure air braced us all. We glissaded down a snow slope to an easy moraine, and crossed below the ice fall of another glacier just far enough to avoid the danger of falling séracs. Then we toiled up a rough glen, where we found cattle tracks. Lars skilfully piloted us in the fast-falling shades of night up to the little col, where all signs of a track disappeared.

We pressed on down the glen, whose steep sides intensified the darkness, until two points of support were insufficient, and we had either to squat on our haunches, or go on hands and knees, with the risk of slipping into the icy stream which rattled down from an adjacent glacier. We put on the rope and soon had need of it, as we had to wade in the darkness a little stream about knee-deep. Progress was so slow that we began to think of finding a sleeping-place, but found none for a long time, during which we descended a steep spur of rock for half an hour.

It may look all right in daylight, but it was a strange place at night. At 11.30 we found a hole, in which we perched ourselves by matchlight on stones of aggressive angularity, making ourselves as little uncomfortable as we could. 'The baby' then claimed our attentions and grew—smaller; and afterwards English and Norsk songs were lustily sung to the running accompaniment of the torrent.

At 4 A.M. we stretched our stiffened limbs, and after four hours of scrambling, wading, and pushing over and through rocks, screes, streams, rainwetted birch copses and the like, we reached the sæter, which is beautifully situated on the shores of the Skjælbrej Vand.

We were disappointed to find no food but milk and fladbröd, but soon discovered that potted game, cream, and water, suitably mixed, make an excellent white soup. The sæter method of cleaning the horn spoons by careful licking did not commend itself to our fancy. The bed into which we turned after our breakfast was small for two, and after Slingsby had had a short sleep he was ungratefully, though fortunately, kicked awake, whereupon he remembered his trout-rod and went out. His efforts resulted in a Sunday dinner of two trout weighing about a pound each.

Though our expedition occupied 28 hours in covering 16 miles of distance, from point to point, we do not think our route could be much improved, and we certainly travelled fast considering the nature of the ground.

The Skjælbrej Vand has not the morose grandeur of so many Norsk lakes, as shores of pasture land and gentle

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slopes covered with copsewood, pines, ferns and grass give it quite an English beauty, but its background of ice-capped mountain cliffs is worthy of the West Justedal regions.

We were much too tired to think of attempting the glacier pass we had thought of making, so were rowed down the lake by a small boy, who told us that every lake and tarn thereabouts was 'fuldt af fiske.' We descended by a good road through a charming village called Hope; thence were rowed over the Hope Vand to Strömme, a fishing village at the head of the Hye Fjord, where we found decent quarters and stopped the night.

Next day, as the weather was bad and the commissariat department a failure, we were rowed hungry along the fjord to Hestenæsören, where we found good and clean accommodation at the post-office. The Hye Fjord is as yet unknown to tourists. It is the wildest branch of the Nord Fjord, and the mountains which rise from its western shores form a weird sky-line of jagged peaks.

On September 8 we made our second expedition in the hope of finding Gjegnalund to be the fine peak it looks from below, and in the belief that it was unclimbed.

Though disappointed in these hopes we had a memorable day.

We started as soon as it was light to row across the fjord, and by 5 o'clock were fairly on our way up Skjærdal. This valley is nearly parallel with the Hye Fjord, from which it is separated by the narrow range of fine peaks already alluded to. The track was good for the first forty minutes, but then grew rough and boggy. Whilst halting at 6.15 we were astonished to be overtaken by a little lad, from a farm an hour behind us, who, in breathless anxiety, and with dishevelled hair, warned us to turn back—for fear of bears! We showed him our axes. He shook his head in dismay, and at last we gathered that, on the previous day, three bears had been seen near a tarn just in front of us, and that the men of the valley had concealed on each side of the lake, on the usual goat tracks, 'selv skyt,' or an arrangement of rifles and guns heavily loaded with bullets, slugs and old nails, with concealed strings attached to the triggers. But for our timely warning we might possibly have fallen victims in place of poor Bruin. As there was a leaky boat on the tarn, the difficulty was soon solved by the boy rowing us over.

The beauty of this lake and its varied surroundings will make it some day a favourite spot with those tourists who love nature in her solitudes. The blue water was studded

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with huge rocks greened over by moss, fern, and birch. The whole valley around and above the lake is covered with these rocks, which have fallen from heights above. Eastwards were thickly wooded slopes; west, an enormous precipice crowned here and there by snow and séracs, and relieved by waterfalls; whilst to the south an enormous amphitheatre of rocks and snow rose towards the jagged mountains beyond. We plodded steadily up the valley, winding in and out amongst, or over and under, the mossy rocks, many of which were far bigger than a sæter, till the slopes became steeper and the vegetation less luxuriant, and soon reached the snow. We passed the amphitheatre seen from below and entered a second, still finer, whose centre was filled with a small lake of deepest blue flecked with an icy flotilla from the glacier flowing into it. The rocks around showed their stratification by great curved bands on the western cliffs.

After a steep ascent up hard snow we reached a col from which a most tempting descent could be made to the Hope Vand. Crossing near the head of West Öksendal, we saw below us in that valley a large tarn, into which the glacier we were on projected, and on each side precipices arise out of the water and seem to block the way entirely. We roped and crossed the névé, south-east of Gjegnalund, and walked straight up a long rocky ridge to the top, which we reached at 12.17. Here we found, as on Kjeipen, the cairn built by the Ordnance surveyors, who had preceded us not long before.

We studied briefly the north-eastern face, which we had thought of descending. It looked formidable, and we decided that in driving snow and rain it was better left alone. We returned, therefore, in our tracks, which were then rapidly filling up, until we were able to descend to the eastern snowfield.

After a long trudge due east we climbed, very easily, a small peak, Björnetind, which stands directly above the lower tarn of Skjærdal.

After building a cairn, we turned northwards along the snow parallel to Skjærdal and crossed a little glacier above a very broken icefall, which terminates in a shoreless lake with lofty precipices on its south side. We were consequently driven to the rocks on the left and over them to the next side valley, and eventually descended by steep terraces to Hyenæs, whence we were rowed by a stalwart girl to Hestenæsören.

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The Ascent of Mjölnir.

From the Nord Fjord we proceeded to Romsdal, with the intention of attempting the ascent of Mjölnir. Mr. Wills's hospitality at Aak afforded us a most advantageous base for the attack.

Two main valleys descend from the high mountain lands to the head of the Isfjord. Grövdal, the larger of the two, is about 8 miles long, and leads to a pass to the famed Eikisdal, and to the fine sharp peak, the Gjuratind. The other valley, Erstaddal, coming from the south-east, has two southern branches, Vœngedal and Kvandal; the former is headed by the Romsdalshorn, and the latter by Mjölnir, whilst between them stands the fine range of the Vœngetinder.

Mr. Wills drove us up to Nedre Dale, which is the nearest farm to Mjölnir, but only about 200 feet above sea level. Ivar Olsen Dale, the owner, and his wife and daughter, were very hospitable, and seemed to be glad to see us, and to put us up for the night, as well as to have a good talk about the world at large. They have a cosy house situated on a sunny knoll, facing Kvandal, but just out of sight of Mjölnir. Everything was nice and clean, and the juniper sprays, scattered here and there in the corners, lent a pleasant fragrance to the rooms. They were much interested in our preparations, and thought that our axes and rope were fishing implements. This was not to be wondered at, as the herring had just been in the fjord, and every man, woman and child, as well as the seagulls, had been thinking of nothing else but fish for some days, and possibly had herring on the brain. As might be expected, the good folks had no name for Mjölnir, but spoke of it and other peaks as the Kvandals Fjelde. Of course we must except a rounded mass which happened to lie due south of Dale, and which we might have guessed rightly to be named Middags Fjeld.

After Mr. Wills had left, we took a short walk up Erstaddal in order to study our route for the morrow. This valley is most beautiful, and its foreground possesses a richness of colouring and gentle pastoral beauty which form the most pleasing contrast to the fantastic aiguilles, solemn snowfields, savage glens, and dark precipices of Mjölnir and the Vœngetinder. We lingered long, and whilst intending to look principally at the mountains, our eyes were often recalled to the valley by the flitting about of the familiar water-ouzels and wagtails from stone to stone in the becks,

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or by some lovely and familiar flower, as the meadow sweet, comarum or pyrola. After watching the rosy tints come and go from each great peak, the dusky shades of evening set in, and sent us reluctantly to bed. We had seen sufficient of the mountain, including the eastern face, the only one not seen before by Slingsby, to lead us to feel sure that at least a first-rate climb awaited us, and that it was quite probable that we might suffer defeat.

Slingsby has written the following account of his discovery of Mjölnir and description of the mountain and its surroundings.

The Discovery of Mjölnir.

One fine day in July 1875 my sister and I climbed a spur of the Troldtinder in Romsdal in order to study the Romsdalshorn, at that time thought to be unascended and inaccessible. We were particularly delighted with the Vœngetinder, a sharp and many-peaked range, which is seen from the main valley and from the fjord, but which is partly masked by the intervening wall of Romsdal. Just beyond the Vœngetinder, we saw a remarkably fine aiguille, which I sketched at the time. This was my first view of Mjölnir. Near the top a sharp tooth rises out of the arête, which bears a striking resemblance to a clumsy hammer, standing with its head upwards, and suggests the name for the mountain, as Mjölnir was the hammer which the war-god Thor wielded to such good purpose when fighting against the Jotuns and Trolds in bygone times. Indeed, it is most suitable that Mjölnir should be in a district where there are so very many petrified Trolds, standing on the mountain ridges in hideous array, so as to be handy in case they should be reawakened to life. In the happy days of general superstition, it was usually believed that if a Trold remained outside after sunrise he was immediately turned to stone. In Romsdal and Söndmöre there have been thousands of erring Trolds, and these districts are very rich in legendary lore.

My second view of Mjölnir was in 1881, from the top of the highest Vœngetind, when I had, for a moment only, a glimpse of its storm-battered crest above a sea of rolling clouds which seemed to engulf the wreck before my very eyes.

In 1884 my wife, Mr. William Ecroyd, Erik Norahagen, and I had a glorious day on the Romsdalshorn, from which we had a distant view of Mjölnir in profile.

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A few days after this, having slept in Vœngedal's sæter, which had been occupied a short time previously by Dr. Scriven and other mountaineers, unfortunately for them in vile weather, Ecroyd, Erik, and I made the first ascent of the south-west or second highest Vœngetind, by the great gully which is visible from the fjord. From the skar, or col, between the two peaks, there was revealed to us, for the first time, the especial grandeur and isolation of Mjölnir and the deep glacier recesses between it and the Vœngetinder.

Three almost parallel glaciers cling to the skirts of the Vœngetinder. They all flow eastwards, and each of the two upper glaciers so completely fills its own glacier basin that there are several lateral overflows on to the glacier immediately below. The highest, or Vœngetinden's bræ, which Vigdal and I ascended in 1881,* has indeed an outlet towards the Vœngedal (North), and though at that time we failed to find a way down from this glacier to its neighbour, I have since seen that it is possible to climb from one to the other. There is only one place where a descent can be made from the middle glacier (Midt bræ) to the lower, or Mjölniren's bræ, far down the glacier, though Ecroyd, Erik, and I tried very vigorously, but vainly, to force a passage down a gully where the rocks were as smooth as the bald pate of a parish beadle. There is a gully very much like this on the Zermatt side of the Mischabel Joch, which has tempted more parties than one to try to descend by it from the upper to the lower glacier, but in vain.

As the two upper glaciers of the Vœngetinder fall over high precipices, where I have seen many avalanches, a direct route to either from Kvandal is positively forbidden. It is almost certain, too, that there is only one way by which the Mjölnir's bræ can be reached from below.

Mjölnir rises immediately out of the Mjölnir glacier with terrible and utterly impracticable precipices, some 3,000 feet high, which terminate in a crescent-shaped crest, of which the convex side faces Kvandal north-east, and the concave side, the weird Svartvand, and the Rensdyr bræ, on the south-west. The crest is extremely narrow, and nearly a mile in length; it is highest in the centre, and forms a most broken sky-line of sharp pinnacles which rival the Aiguille de Charmoz in the Alps. A blunt arête rises out of the head of Kvandal, between the Mjölnir's bræ and Kvandal's glacier, which latter lies east of Mjölnir, and with the roots

* See *Alpine Journal*, vol. xi. No. 79, p. 154.

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of the horns of the crescent, gives a triangular base to the mountain. The blunt arête becomes eventually merged in the north and east faces. The eastern face, which I saw at first in profile only, consists of a dark mural precipice, a very savage contrast to the glittering snows of the Kvandal's bræ just below it. Above this wall, there are a few steep buttresses and miniature gullies, but they vanish near the top.

The only place that seemed to offer even a ghost of a chance of success to climbers was up this arête, and then—somewhere. But where was somewhere? Both horns of the crescent are impracticable.

We descended from our peak by a steep gully to the head of the Midt bræ, then reached the Mjölnir glacier, and, after giving Erik some good lessons in ice craft, we crossed out of this wonderful cirque by a col—Mjölniren's skar—just under the western horn of the crescent, and descended by the Rensdyr bræ (Reindeer glacier), directly under the south-western or concave side of Mjölnir. We examined the crags on this side most critically, and agreed that the lower portion was practicable, but that the way would be very intricate. As to the upper part, it was delightfully obscure. It was, however, as plain as daylight that the rock-climbing on this side would be much shorter than on the other, and it was quite evident that the ascent of Mjölnir would prove to be a difficult one, and we much regretted that fate would not then allow us the time to try our luck upon so noble a mountain.

After passing a blue lake, miscalled Svartvand, we surprised a herd of reindeer which were feeding on Ranunculus glacialis. Then we descended to Marsten in Romsdal by a rough gully, appropriately called Skomageren's skar (The Shoemaker's Pass), on account of the leather-destroying properties of the stones. The difficulties of this descent were much increased by the presence of immense quantities of wild raspberries, strawberries, and bilberries, all ripe, which a stern sense of duty impelled us to stop and pick. This expedition was a first-rate one from every point of view, and, almost to the last, it was uncertain whether we should be able to make our way across the glaciers, and to descend to the Romsdal, or be obliged to retrace our weary steps over snows, crags, and screes to Vœngedal again.

W. C. S.

Next morning, September 12, we set off at 4.50 down the dewy meadows and across the sparkling trout stream, and

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after a gentle ascent through a fine forest, where the bilberry leaves were bronzed by the autumnal sunshine, we gained the open and flat ground of Kvandal. At 6.40 we reached the old moss-covered moraine of the Kvandal's bræ, and crossed it to a spur N.E. of this glacier, in order to avoid an icefall. At 7.35 we halted to make a further study of our peak and of the Mjölnir glacier, down which we might want to return, and to enjoy the glorious views of the Vœngetinder, which were infinitely finer than Hopkinson had expected them to be.

We soon started again, and crossed the Kvandal's glacier diagonally towards a gully which descends from 'the blunt arête.' The snow was very hard and steep, and after we had crossed it we said: 'We ought to have roped.' As we neared the gully it began to look very bad, and we abandoned the idea of trying it, on account of the fear of falling stones, so we turned to the right a little below it.

It was then 8.15, and we had made about 3,000 feet. Here our rock-climbing began in earnest, and at once hands had to do their share of the work as well as feet. After mounting 350 feet we were fairly on the blunt arête, with a glacier on each side. We crossed over the top of the gully which we had aimed at, and it looked very savage, and was bristling with icicles. We soon put the rope on, and found our axes and Lars's knapsack to be fearful nuisances. At first the climb was of the true arête character, our backs being *now* to the north, *now* to the east, and *now* midway between the two.

After about a thousand feet, the rocks became steeper and steeper, and the arête merged in the two rock faces, of which the northern was nearly sheer, and without a pretence at either hand- or foot-hold, like a Wetterhorn precipice, whilst, though the lower part of the eastern was perpendicular, it was partly broken above, as Slingsby had before told us.

Lars led us in good style, and as we rose in height so also the spirits of all rose in sympathy. We had to follow a series of narrow ledges, all of which sloped downwards towards the mural precipices rising out of the Kvandal's glacier. Then came some narrow chimneys, where one of us had often to make a back, as if for leap-frog, so as to give Lars a step, and where we were hoisted up by him in return. In one very awkward corner some moss happened to grow pretty profusely; this was extremely slippery, and a thin sprinkling of snow did not mend matters. Fortunately the rocks were

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not much glazed. If they had been we should soon have been defeated.

After some really glorious climbing, which will long live in our memories, we reached a grim col in a vicious arête, and found that we were looking down into the hollow of the crescent. We turned to the right up a high crag with very great care, and after crossing over one distinct peak and several minor points, and along a narrow and jagged arête which will vie with any in the Alps, we reached the summit at 11.23. As it was much too sharp to form a good seat, we climbed down into a notch for our lunch.

The near view, especially of the Vœngetinder, was very impressive, but, for the most part, the mountains in sight were the ordinary hog-backed, lichen-covered fjelde, fit for the reindeer but not for the mountaineer; still, we could see in the distance many mountains which will, some time, give capital work to climbers.

After building a small and insecure cairn we thought of the return, and did not at all relish the notion of descending by the way we had come. The character of the climb was much like that met with on the north face of the Ober Gabelhorn, but was much steeper, longer, and finer altogether.

We looked down on the S.W. side, and thought that we could trace a way for several hundred feet, and as Slingsby had observed the previous year that the lower portion was practicable, we agreed to attempt the descent on this side, and thus to add more variety to our climb.

At 12.45 we left the top, and worked towards our left down jagged rocks which afforded good hold. These soon gave place to smooth steep rocks, which were firm enough, but had little hold. Down these we climbed carefully, one at a time, into a shallow gully, just under the col, which we first reached on the arête, and found ourselves on the top of an impassable precipice. We were perfectly cut off from a promising chimney just below the south arête by a crag whose smooth surfaces had quite an old-fashioned drawing-room table polish about them. To the right also our way was apparently cut off by another sheer precipice. Carefully exhausting the possibilities before accepting defeat, we were fortunate enough to find a steep gully a few feet above us, which led down to a broad ledge invisible from above. We very carefully climbed down to this ledge, and traversed the cliff to the right. This brought us to a small sun-warmed basin of rock, a pleasant contrast to the icy ledges of our ascent.

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From this point we made rapid progress, finding a good traverse to the right whenever the direct descent became barred by precipices, and climbing into and out of one gully after another.

At 3 o'clock we reached the Rensdyr bræ, and after half an hour's trudge through soft snow we sat down on the warm rocks on Mjölniren's skar. This pass, already described by Slingsby, has two little cols. The first party took the most southerly one; we made a mistake, as it afterwards proved, and hit the northern col. From here we had a capital view of our peak in profile, including the hammer itself, a pinnacle about 150 feet high, with an overhanging top much resembling the Napes' Needle on Great Gable in Cumberland.

Hopkinson and Lars took a run up the most southern tooth of the Vœngetinder, in order to have a good look at the Romsdalshorn, whilst Slingsby made a sketch.

At 4.15 we began to descend. As is the case with many a pass in the Alps, the top 300 feet were prodigiously steep. Our way was limited to a narrow serpentine band of snow underneath a high wall of rock on the left, as on the right hand there was a cliff below us crowned by a small cornice. Several protruding teeth showed us that the rock had but a scanty covering of snow, and that, though the snow was in capital condition, great care would be needed. Slingsby led the way. After about 150 feet had been descended, the band came to an abrupt end on the top of a high crag. Here we had to make a very awkward traverse below a smooth boss of rock upon soft and treacherous snow. Fortunately there was good anchorage on each side of the boss; had this not been the case, we should have returned to the southern col, though it would have cost us a good hour's work. Beyond the boss we kept on the level, with cliffs above and below us. This brought us to within two ropes' length of a tongue of the glacier, and here we again began to descend. At first there were fifty feet of snow as steep as one ever cares to meet with. Then came bare granite. We all came down a little. Then, whilst Lars and Hopkinson held on, Slingsby was lowered a little in order to look at the bergschrund below, and then was slowly let down on to a mass of snow which had bared the granite and filled the jaws of the schrund, there very narrow. Luckily the snow was tolerably firm, though an ice-axe could be poked through it. After a little gentle beating down, the bridge was consolidated, and Hopkinson came down. Whilst one of us was anchored below the lower lip of the schrund, the other held

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up the axes as a step for Lars, whose turn had come. However, with perhaps laudable pride, he persisted in trying to climb down the rocks, about twelve feet high, alone, where climbing was impossible, and down he came, and there was a medley of men, axes and rope. We all had a good laugh, and then looked down into the depths of the crevasse a few feet away. We had been exactly an hour from the col and had lost no time whatever.

The waning light bade us to hurry, and after threading our way through a maze of crevasses, and passing the gully down which Slingsby, Ecroyd, and Erik had descended the previous year, we escaped from the glacier by scrambling down a long gully over which the wall which separates the two lower glaciers overhung. There were many stiff places, and our excitement was maintained to the very last by the uncertainty of our being able to force a passage. We were very nearly beaten in one place. By climbing our best and quickest we reached the final snow slopes below the Midt bræ, and here we raced down and were fairly clear of the glacier and in the valley at 7 o'clock.

A lively trot through Kvandal brought us, at times varying from 8 to 8.30, to Dale again.

Frue Dale was most kind and attentive to us, and an admiring audience thronged round Lars, who modestly told of our adventures. Ivar Dale was much disappointed when told that we were going to drive to Aak that evening, and expressed a wish to see us again, which Hopkinson has already done.

Mjölnir is by far the finest peak in the Romsdal group, and it presents more varied and stiffer climbing than The Horn or the Vœngetinder. The ascent by the south-west face would doubtless be easier than by the blunt arête; but the way would be more difficult to find, as the traverses are frequent and some of them long, whereas our route presented little possibility of deviation.

It is a great, but very unusual, luxury to be able to start direct for so fine a peak as Mjölnir from such cosy quarters as Nedre Dale, and there is little doubt of there being many a good expedition from there in the future. When we say that Mjölnir is barely 6,000 feet high, that we went very quickly, only making two long halts, and were out between 15 and 16 hours, it proves the work to have been really good.

Three days later we made an attempt to climb the highest Troldtind from the Middagshorn. The latter rises by steep grass slopes and patches of bare rock immediately opposite

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Aak to a height of 4,000 feet. Behind it, a little glacier fills a basin, guarded by a high rampart of rocks. This rampart is broken by two deep notches, clearly seen from Næs. From the higher notch, a couloir comes down to the glacier.

In 1879 Hopkinson found the couloir to be completely cut off from the glacier by an open bergschrund. This time the schrund was closed up, and we began to climb the couloir under Hopkinson's leadership. It was a strange place, a very steep and deeply cut groove about 850 feet high, about 12 feet wide, and with a high and perpendicular wall on each side. Our only anxiety arose from a fear of avalanches, as a fierce wind blew blinding mists of fine-grained snow-crystals in our faces and down our necks. However, we saw that this only came from the peak above us, and that the snow in the gully was all right.

It was most laborious work for the leader, and very chilly for Lars, who began to feel ill about halfway up. When at last we reached the col—a 'windy gap' if ever there were one—we dug a hole in the snow for Lars to shelter in, whilst we gave him some *aquavit*, which soon restored him. As the weather had obviously gone to the bad, we agreed to descend by the opposite side, which is rather easier, and to leave the peaks for the future. The great Trold was just above us, and very wicked he looked too. The rocks at the back are most fantastic, and some five-and-twenty jagged columns tower up in melancholy array, and thoroughly accord with the name of the range, the Trold peaks. Our descent was a most interesting one, though made first in a snowstorm and then in drenching rain.

Though the height of the Norsk mountains is not great, there is now no need to recommend them to climbers in the half-apologetic manner which was necessary a few years ago, as their claims, as a good field for exploration and for the best sort of climbing, are fully recognised.

As the limits of this paper do not allow of repetition, we refer any climbers who may happen to visit Norway in the future to former papers in the 'Alpine Journal,' and to those in the 'Norske Turist Forening's Aarbog.' Many of the latter are written in English; especially we refer to the 'Aarbog' for 1883, where a good deal of new work is suggested. Many excellent hints will be found in these papers.

In the Jotun Fjelde, where are the highest mountains in Norway, though there are few maiden peaks remaining,

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there is yet plenty of good new work to be done, and there is now capital accommodation, and, what is very important, there are now—bridges. The Justedal's bræ is a most noble snow-field, and is not yet fully explored. Its many western ice streams show wilder ice scenery than any in the Alps. There are actual ice falls—not of névé, but of real hard blue ice, nearly 6,000 feet high. Bears are common thereabouts. This great snow-field must not be crossed in the nightless days of the end of June or beginning of July, as snow *can* be soft in Norway as well as in the Alps.

The most promising fields for exploration now are in Söndmöre, Romsdal, and within the Arctic circle.

We most strongly recommend any mountaineers who may happen to travel by the west coast land-and-water route to forsake, for once, the gloomy, overrated, guide-bookish Geiranger Fjord with its shoreless mountain walls, and to go instead to the Hjörund Fjord west, the grandest in all Norway. When there, they should climb Slogen, either with Jon Klok or Peder Haugen. This peak is extremely sharp, but not difficult to climb; it is only 5,200 feet high, and, according to Slingsby, it affords infinitely the most varied and beautiful view he has ever seen.

Once on the top, in fine weather, the mountaineer will see all around him many unascended, and probably difficult jagged-crested peaks. He can take his choice, few have yet been climbed. As the glaciers are small, and soft snow not very troublesome in Söndmöre, June and July will be suitable for this region. On two mountains above the Hjörund Fjord there are large holes in the ridges, through which one can see the clouds scudding about on the opposite side. One of these, on Gluggen Tind, is 18 feet high by 6 feet wide. Tradition says that King Olaf the saint was once out on a sporting expedition near here, and saw a Trold on Gluggen Tind; he immediately shot an arrow at the Trold; whether he aimed well or not one does not know, but, at any rate, the arrow pierced the mountain and fell near Standal, where a portion of it now forms a respectable little bridge 16 feet long, and was shown to Slingsby in 1876. The tale must be true, as the hole is there, plain enough to be seen from the fjord itself, and the arrow lies just where it ought to lie. The Söndmöre folks, a fine race, are delightfully superstitious, and are descended from Scotchmen who repeopled the district after its complete depopulation by the 'Black Death.'

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THE IMPONJWANA.

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The Kahlamba Mountains.

By A. H. STOCKER.

The Kahlamba Mountains, or the Natal Drakensberg, generally called the Berg, lie for the most part between lat. 29° 20′ and 30° 30′ S., and long. 28° 30′ and 29° 30′ E. The main ridge runs in a more or less north-westerly direction from Giant's Castle to Mont aux Sources, a distance of about 60 miles, with a height of from 9,500 to 11,500 feet. I believe the ridge, keeping a fair height, runs on from Giant's Castle towards the S.W. Northwards it divides; one ridge runs W.N.W., between the Free State and Basutoland, and the other, at a much lower level, N.E. and N.. to join the high water-parting on the E. coast of Africa, till presumably it culminates, after a few breaks for rivers, in Kilimanjaro. The main ridge, above referred to, forms the boundary between Natal and Basutoland, and presents two distinct features. On the W. at first it slopes off gently into Basutoland, clothed with rank grass. For some remarks on this W. side of the Berg I may refer to the August number of the 'Proceedings of the Royal Geographical Society,' in which a most interesting paper by Col. Sir Marshall Clark, K.C.M.G., will be found, together with a small-scale map of the Basuto country and Natal border.

But on the eastern side of the range a totally different kind of country meets the view. In the place of gentle grass slopes the Berg presents a long line of magnificent kranzes (precipices). These, absolutely sheer in places, are broken up by innumerable gullies and buttresses. The gullies cut deep into the Berg, and afford in many cases the only means of reaching its summit ridge. But of the buttresses and shoulders I hardly know what to say. Word-painting cannot describe them; they must be seen to be appreciated. They are a magnificent array of peaks, aiguilles, and pinnacles, cut up into fantastic shapes, and generally with exceptionally steep sides.

One other feature of the Berg must be mentioned. The upper waters of the rivers are separated by sandstone spurs, 6,000 to 7,000 feet high, with water-worn, or perhaps glacier-worn sides. These spurs, all vaguely called the Little Berg, are in many places quite unassailable. Most of them have, however, certain well-known tracks (called passes), very steep, used by sportsmen and Kaffirs, which give access to their summits and their numerous caves. In the absence of Alpine huts and conveniently situated hôtels, these caves are invaluable. There are any number of them, varying in size from the meagre shelter of an overhanging rock to the large deeply-hollowed cavity which will hold 200 or 300 men. Most of them are situated at the foot of the highest line of kranzes in the so-called Little Berg, and they have generally wood and water within easy reach.

The season for climbing in Natal is the winter. This is rather a drawback, for it means shorter daylight. The summer, with its longer days, is unfortunately the wet season, lasting, roughly speaking, from November to March. The time for climbing, when the weather may generally be trusted to be fine, lasts from about the middle of April

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till the end of September, and the best month of all is June. During this period the daylight lasts from ten to twelve hours, and it is not at all uncommon to have five or six weeks without a drop of rain, without even a cloud in the sky.

In spite of this information, drummed into me by many kind friends, I could not resist the 'fell fascination' of the glorious line of hills, which each morning in December and January glowed in the summer sunrise in front of my brother's house. And at last, by dint of continual nagging, I dragged my brother (Mr. F. R. Stocker), all unwilling, on January 23, 1888, to Gray's Cave (6,200 feet), on the Sterk Spruit Berg. I had my reward; it was the only wholly wet week in the month, and of course we did nothing.

Our second trip was made in April, when we (my brother and I) succeeded in ascending * Champagne Castle (11,355 feet). This was followed by a prospecting trip in the beginning of May with Mr. F. L. Bridger, who accompanied me for shooting purposes. My chief object was to find a good tent platform as high as possible in the Cathkin Spruit gully.

On May 21 my brother and I again ventured forth to Gray's Cave, but rather in fear and trembling, for the glass was abnormally low. The next day a terrific gale was raging, and we did not stir. But on Wednesday (23rd) we got off with our tent and a few necessaries. We were able to carry them on a pack-pony as high as 7,800 feet; from that point the Kaffirs helped us to drag them up to a splendid little nook (8,180 feet), sheltered by rocks and a tree, where we pitched the tent, and spent three very pleasant nights. On the 24th we made our first attempt on Sterk Horn (or the Little Tetelelu, as the Kaffirs call it). We were late in starting (8.30 A.M.), but by going steadily we got to the top of the very easy Sterk Horn Pass (9,460 feet) at 10. We descended a little on the western side, and crossing the fine west arête reached the foot of a chimney leading in broken steps to a conspicuous slope of grass, which runs across the whole west face, just below the steep final rocks. There were three 'pitches' in the gully, and we experienced some slight difficulty in getting into it across a sloping slab of rock. The first pitch was easy; the second fairly easy; but the highest gave us some trouble, owing to the absence of good handhold. With a little assistance from each other we scrambled up somehow, fortunately finding the jammed boulder at the top quite firm. The uncompromising appearance of the rocks above made us hunt for an easier way, and turning north we walked along the broad grass ledge towards the great gully between the south and north peaks. On the way we made an attempt to scale the north-west buttress of the south peak by a series of narrow ledges, but gave it up. It was fairly easy work, but the rocks above looked bad. Still, I believe it is a possible way, for it leads to the second ledge, from which the highest ledge might be reached; thence the climb to the summit is easy. We looked at the north face, but, as it is smooth and very steep,

* See letter sent by Mr. T. W. Wall to the *Alpine Journal* for August 1888, pp. 56–57.

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we gave up Sterk Horn for the day. We skirted under the Upondo, or Middle peak, at the head of the great gully, and easily gained the north peak from the west side (10,093 feet). We tried to take compass observations, but everything was highly magnetic, and the observations were practically useless. After a peaceful half-hour we descended easily by the east face, and reached the tent at 3.17 P.M. It may be remarked in passing that my brother had made an attempt to climb this north peak alone in 1886, when he reached a pinnacle on the north arête about 9,600 feet.

On the next day we had one more look at Sterk Horn. We were delayed by wind, but got off at last at 11.30. We went up the gully as before, and then out under the east face of the south or highest peak. We first tried a very promising-looking chimney, but found it more difficult than it looked. Then we made an attempt on, and got a few feet up, the east buttress, but as the wind was unpleasantly strong, and the rocks nasty, we decided to give it up. On the Saturday a really terrific gale was blowing, and we got down to the cave with difficulty, and afterwards down home as fast as we could.

On June 12 we made for a new district up the Umunweni river, round which some of the finest peaks are situated. The Ibotwana ridge, which divides the waters of the Umunweni and Lambainja rivers, contains some of the grandest pinnacles in the whole district. From it I suppose the river derives its name, for Umunweni means 'the place of fingers.' We were delayed on our way, partly by bad weather and partly by the pack-horses and Kaffirs going astray, and it was the evening of the 18th before we reached a cave (6,435 feet) that would suit us. From it we made two expeditions; the first was up the right-hand tributary of the Tonyalana, a left tributary of the Little Umunweni. We wanted to get on to the north peak of the Segwana Cirque (about 10,800). We started at 7.40; but it was very slow work at first, for the lower part of the valley is filled with dense prickly bush. Thence we got on better on steep grass and rock slopes above the right bank of the stream. The rocks at the head of the main valley are very nasty looking; but fortunately at 8,770 feet a side gully runs down from the west cliffs of the cirque. Up this we turned, and after a light lunch, in a cave at 9,500, which, though small, would do very well for a night's bivouac, we climbed up about 500 feet further. It was then 1 P.M.; there were still some 300 or 400 feet to the top of the gully, and an unknown amount of scrambling along the arête to the summit. The work consisted of easy grass slopes and awkward steps of rock, all covered with fresh soft snow. We decided to descend, and the thought of the dense bush of prickly wild asparagus at the foot of the valley had as much as anything to do with our giving in so soon. As it was, it was nearly sunset when we reached the cave. On the 20th we got off at sunrise, and after a wonderfully easy walk up the left tributary of the Tonyalana, at 10.50, reached the top of the Imponjwana Pass (9,850 feet). Thence it was an easy walk over grass and rocks, covered for the most part with soft snow, to the long flattish lower summit, called the Umunweni Castle (10,460 feet). The summit peak of the Imponjwana was cut off from us by a magnificent

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chasm some 1,500 to 2,000 feet deep, and about 150 yards across. The rock scenery round is simply magnificent, and could draw expressive remarks from the most cold-blooded. I forbear; the 'Alpine Journal' is not the place for such enthusiastic outbursts. We spent an hour enjoying it, and returned the way we had come. And three days afterwards we were at home.

In July Mr. Douglas Parker and I did a little photography and exploring round Cathkin Berg, and discovered a new cave. But climbing was out of the question, as all the rocks were covered with deep fresh snow. This cave—the Eagle Cave (5,900)—formed such splendid headquarters that I went up again on August 1, and my brother joined me on the 10th. On the 11th we moved and pitched our tent amongst bush and boulder in the Inkosana Valley (6,790). The next day we made an attempt to get up Cathkin Peak by its great southern gully. It is a fairly broad gully, filled in with rock-ledges and slopes of *débris* on its right side, with steep rock faces on its left side. We ascended at first by the slopes, but as they became awkwardly steep we struck across into the stream-bed, which was full of snow, hard enough in places to require step-cutting. At 12.30 we had only reached 10,120 feet; some 800 feet still remained to be done, and as the only real difficulties lay there, we knew we were beaten. We descended by the water-course, using the rope to negotiate a waterfall of 50 feet. Just below this we turned out to the east and finished the descent by the slopes under the south face, reaching the tent a little before sunset. The next day we returned to the cave, and on the 15th trekked across to Gray's Cave, on the Sterk Spruit Berg.

Here we were delayed by three doubtful-looking days, which prevented any serious work, but on the 19th we got off just before sunrise for another attempt on the Sterk Horn. This mountain has three peaks—the north (ascended by us in May), the Upondo or Middle peak, and the south peak, which is the highest. This last is a wedge of rock about 500 feet high, running N. and S., with a small buttress on the east side. The west face is steep, but it has two grass ledges running right across it, above the great grass slope mentioned in the May trip. The east face is very steep, except the east buttress and the bay or angle between it and the south ridge. This bay consists of two steps; two chimneys lead on to the first step, and one to the second and on to the top. At 10.56 we reached the rocks and tried the right-hand of the two lower chimneys; we failed again, as we had done in May, for a boulder in the middle forces the centre of gravity uncomfortably out. The left-hand chimney looks very difficult. We were therefore compelled to try the east buttress. Our first attempt led to the same narrow sloping ledge of rock which had turned us back in May. We were almost in despair, but fortunately my brother pointed out a possible scramble, a little further to our right (N.), which eventually proved the first step in the right direction. Some steep grass and sloping rocks led to a ledge on the east face. The rocks above are steep and smooth, and we were forced on to the south-east edge of the buttress. A rather nasty traverse, with little hold, led to the large plateau of grass on the S. of the shoulder, just above our

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old friend the chimney. As the gully in the corner looked nasty we continued our climb by the south-east edge. An ice-axe step led to a sloping ledge under an overhanging rock, and round an awkward corner to easy work again on the second or upper step in the bay. The south-east edge then became uncomfortably steep, and we were forced along the grass slope into the highest chimney. It was steep, but afforded good hold, and landed us at 1.40 close to the summit—a very unstable-looking arrangement of large boulders (10,230 feet). We spent half an hour of blissful rest on the top, though personally I must confess that a little bit of the bliss was taken out of it by the thought of the descent. After building a small cairn and setting fire to as much grass as we could find, we decided to try a descent by the west face, for we both had a wholesome dread of the way we had come up. The first two chimneys, near the south end of the hill, were easy, and landed us on the upper of the two narrow grass ledges which cross the west face. It can hardly be said that we climbed down the next two steps, for I let my brother down, and then, putting the rope over a cobble, went down, hand over hand, to join him. The lowest step gave us most trouble; we had a good look at three chimneys before we decided to go down by the fourth, nearest the south end of the peak. They were like most chimneys; the first few feet, over the inevitable boulder, presented the only difficulty. We chose the south chimney because it had a ledge halfway down, and thus enabled us to make use of our eighty feet of rope doubled. Once on the great grass slope our work was over. We crossed the north peak at 4 P.M. and raced down the slopes on the east side, reaching the cave at 5.40, just before dark. We were only just in time, for the next day (20th) we were treated to dense fog and thunderstorms, settling at last into steady rain. Our supplies were nearly exhausted, but, thanks to the abominable weather, we could not get away till the 22nd. On that morning, as we finished the last fragment of our stores the weather cleared and we got away, reaching home soon after sunset, and catching momentary glimpses of the Berg with fresh snow on all the upper rocks.

On October 11 Mr. Andrew Gray and I went up to the Eagle Cave, on Cathkin Berg, for another attempt on Cathkin Peak. My pack-pony and Kaffir never turned up. We spent two nights there waiting for them, and living on the supplies which Mr. Gray had luckily brought with him, whilst the weather was making experiments in thunderstorms and various other little surprises. On the 13th, with our patience and supplies exhausted, we trekked to our respective homes. I was caught in a thunderstorm on the way, and when I got in at 3.15 I felt I was well out of a bad job.

The few successes and many failures recorded above only show that climbing in the Drakensberg requires a little more preparation, better planning of trips, and a more lengthy stay at each cave headquarters, than we were able to give. With such improved arrangements there could hardly be a more tempting locality for the rock-climber, but only for the rock-climber, for there is not even an incipient glacier. And this last fact compels me to add a word of apology for taking up so much space in writing of hills which lie below the snow-line. In

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spite of this fact, the rock pinnacles are grand enough and difficult enough to satisfy anyone who loves a good rock scramble.

Notes on the Map.

C. Cave.
1. Woodhouse Kop.
2. S. Tugela Gate.
3. Mont aux Sources, 11,500 (?).
4. Imponjwana, 10,550 (?).
5. Umunweni Castle, 10,460.
6.6. Two peaks of Umponqwasi.
7. Inkosana, 11,050 (?).
8. (Tetelelu, or) Cathkin Peak, 11,000 (?).
9. Sterk Horn, 10,230.
10. Kantunja Arête.
11. Isiwa Nimpumalanga, or East Kranz, 11,100 (?).
12. Pass, 10,630.
13. Sterk Horn Pass, 9,460.
14. Umhlwazin Eland Pass, 7,050.
15. 7,315. (The Little Berg, Sterk Spruit Berg, Cathkin Berg, and Noginya Ridge, are sandstone, varying from 6,000 to 7,000 feet in height.)
16. N. peak } of Segwana Cirque,
17. S. peak } each about 10,800.
18. Two peaks, about 10,700.

The outlines of the map which accompanies this paper are based on that of Mr. Alexander Mair (land surveyor, Natal) published by Messrs. Stanford and Co., of London.

ALPINE NOTES.

The Present Volume of the Alpine Journal.—With the view of keeping the size of the present volume of the 'Alpine Journal' uniform with that of its predecessors—despite two unusually large numbers recently issued—it has been decided to bring it to a close with the publication of the number for November next. As that number will therefore contain the index to Volume XIV., the Editor requests that all contributions for insertion in it may be forwarded to him as soon as possible. Volume XIV. will thus contain six numbers only (in lieu of the eight which ordinarily make a volume). A further advantage of this change is that henceforth each volume will include the issues of two complete years (instead of, as on the old plan, bits of three), and may thus be lettered more conveniently when bound.

Picture Exhibition in the Club Rooms.—Lovers of high mountain scenery have been in luck this year, for the exhibition of Signor Sella's photographs, which was on view at the Club rooms from June 5 to 8, was a treat in itself, even though it came so soon after the exhibition of Mr. Donkin's work. The gigantic pictures in platinotype were especially noticeable. Of these there were two in particular which are as good as any photograph of the Upper Alps which has yet been produced. One, of the Matterhorn from the Dent d'Hérens, No. 279, was enlarged from the well-known view with the light cloud clinging to the Italian side of the great peak. The other, which to most eyes seemed much improved by the enlargement, was a view of fine snow crevasses on the Glacier du Chardon, in Dauphiné. The

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Dauphiné views, indeed, were a marked feature of the show, and included grand panoramas from the Pic Coolidge (Nos. 504–6), the Grande Ruine (Nos. 490–3), Meije (Nos. 497–9), Rouies (Nos. 482–3), &c. Signor Sella was very fortunate in one or two of his cloud effects, one from the top of Castor (Nos. 463 and 464) being perhaps unrivalled in its representation of a pure snow arête, in the immediate foreground, standing out of a vast sea of clouds, above which the big peaks alone were visible. There were many other views of rare merit (*e.g.* Nos. 142, 395, 472b, &c.) which cannot be noticed here, and members will be glad to learn that Signor Sella has generously presented to the Club all the enlarged photographs exhibited by him—a magnificent addition to a collection which (as the President remarked in his announcement of the gift) is rapidly becoming unique.* There were also exhibited some eight oil pictures by Signor Micocci, fulfilling an expectation of long standing. It is not often that we have the opportunity of seeing the work of Italian painters of mountain scenery, and Signor Micocci's pictures were therefore looked upon with considerable interest. He does not aim at hard and striking effects, but he produces careful and accurate studies of pleasant subjects with which we are all familiar.

Maps of the 'Guide du Haut-Dauphiné.'—We learn that the five maps belonging to this guide-book, which have been unavoidably delayed in preparation, will very shortly be distributed to the subscribers to the book. There is some idea of issuing next spring a supplement to the text of the book, which would contain descriptions of the new ascents and routes effected in the district since the publication of the work in July 1887.

A Recent Ascent of Popocatepetl.—On May 11 of this year I made one of the most interesting excursions (outside climbs in the Himalayas) that I ever undertook—the ascent of Popocatepetl, 18,750 feet in height. I left the city of Mexico by an early morning train for a town called Amecameca, situated at the foot of the snow-covered peaks of Popocatepetl and Iztaccihnatl (the Woman in White). Here horses and guides were waiting for me, and at 12.30 I got under weigh and rode up to a little chalet (14,000 feet), where I spent a most miserable night, nearly perishing from cold and fleas. It snowed nearly all night long, but at 4 A.M. it was sufficiently clear to make a start. For an hour we stuck to our horses, and after that began the climb on foot. It was a heartrending grind up steep snow all the way to the crater, but there was not a single difficult or dangerous step. I reached the lower lip of the huge crater at 9 A.M. I have rarely seen anything more terribly grand than this gigantic 'cirque,' the absolutely sheer walls of which descend some 800 or 1,000 feet. Great jets of roaring, hissing steam shoot up in twenty or thirty places, depositing layers of pure sulphur and melting the snow for yards around them. Avalanches of rock and ice were continually falling on all sides. After a rest I continued the ascent (some 800 feet, perhaps), by a broad arête, which led, in about an hour, to the summit. A terrible storm

* Copies of the photographs can be obtained from Mr. Spooner, 379 Strand.

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of wind and snow was raging, and the cold was almost unbearable. Of course, under these circumstances, I saw nothing from the top, but on descending to the northern rim of the crater it cleared off beautifully, and *the* most extensive view I ever beheld burst upon me. Opposite, beyond a deep depression, rose Iztaccihnatl, only a few feet lower than her gigantic neighbour, and much more beautiful in form. In fact, Iztaccihnatl looks like the Grand Combin, while Popocatepetl is merely a white cone. Orizaba, a perfect sugar-loaf, towered up a hundred miles away. At my feet, on the left, lay the valley and lakes of Mexico; on the right, that of Puebla. I *ran* down to the chalet in exactly one hour, and thence returned on horseback to Amecameca before dark. Here a special train was waiting for me and I was whirled back to Mexico the same night. H. R. WHITEHOUSE.

SOME NEW EXPEDITIONS IN THE CHAIN OF MONT BLANC.—Two careful narratives of some important new expeditions in this chain have lately been published, a summary of which will probably be of great interest to our readers. One of them is the ascent of Mont Blanc by perhaps the longest and most circuitous route yet achieved.* This was achieved by Herr M. Kuffner, with Alexander Burgener, Josef Furrer, and a Swiss porter, though the title of the paper, 'An Ascent of Mont Blanc from the Brenva Glacier,' is a little misleading. From Courmayeur they mainly followed Mr. Freshfield's Col de la Tour Ronde route.† The first night was spent on the rocky ridge (the Mont de la Brenva of Mieulet's map) which separates the eastern arm of the Brenva Glacier from the Glacier de Toule. Starting very early next morning, the party gained without difficulty the point at which this spur joins the main ridge between the Col du Géant and the Mont Maudit. This is a snow hump just south of the Eastern Col de la Tour Ronde, and thus S.E. of the Tour Ronde itself (Reilly's map is correct here; Mieulet's wrongly makes the ridges unite at the Tour Ronde itself). Descending on to the col, the party traversed the northern face of the Tour Ronde peak (a lofty tower of rock) and with great difficulty and danger regained the main ridge beyond, apparently at the point known as the Western Col de la Tour Ronde.‡ The second night was spent just where this ridge was regained, at a height of between 3,500 and 3,600 mètres. The views here were magnificent, but the bivouac place was not the most comfortable that can be imagined. Starting at 5 A.M. on the third day, the party continued their way along the ridge between the Tour Ronde and the Mont Maudit, being obliged to cut many steps in the icy arête and to turn many rock towers, and finally gained the summit of the Mont Maudit at 1.30 P.M. Thence they followed the usual route taken by parties starting from the Aiguille du Midi hut and reached the summit of Mont Blanc at 4 P.M. on the third day after their departure from Courmayeur. In $1\frac{3}{4}$ hour more they reached the Grands Mulets, glad to find so comfortable a resting-place after two nights out. Herr Kuffner considers that the expedition is very

* *Oesterr. Alpen-Zeitung* for January 11, 25, and February 8, 1889.
† *Alpine Journal*, vol. iv. p. 59; vol. v. pp. 231–2.
‡ *Ibid.* vol. vi. p. 384; vol. xii. pp. 120–1.

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difficult, and requires settled weather, but does not think it dangerous, for a certain perilous couloir on the northern face of the Tour Ronde can be turned. The article is illustrated by a heliotype (from one of Signor Vittorio Sella's photographs) of the Tour Ronde ridge as seen from the Glacier du Géant. The expedition took place on July 2–4, 1887.

The other new ascents were made in the summer of 1888 among the peaks which close in the head of the great Argentière Glacier, one of the finest and still one of the least known of the great glaciers in the neighbourhood of Chamonix. The party consisted of MM. A. Barbey and L. Kurz, both members of the S. A. C., and their narrative may be found in No. 4 of the 'Echo des Alpes' for 1888. Having bivouacked on the Jardin at the foot of the Arête des Améthystes (which comes down from the Aiguille d'Argentière), these gentlemen, with Justin Bessart, of Chables (Val de Bagnes), and Joseph Simon, of Frasserand (near Argentière), effected on August 11 the first ascent of the peak which rises just where Mieulet's map marks 'Le Darrey' (3,881 mètres), but which is henceforth to be known as the Aiguille de la Neuva, its height being about 3,750 mètres. A first attempt from the col between it and the Aiguille d'Argentière (Messrs. George and Macdonald's Col de la Tour Noire) was unsuccessful, and the party were forced to redescend to the S. foot of the peak, whence by a couloir they climbed straight up to the summit. After enjoying the magnificent panorama they went a short distance down towards the gap between the peak and the Tour Noir, and then rejoined the couloir by which they had come up, the descent to the level of the Argentière glacier occupying 1¼ hour. As the peak rises between the Tour Noir and the pass usually known as the Col de la Tour Noire M. Barbey proposes to change the name of this pass to Col des Améthystes, reserving the name Col du Tour Noir for the depression between the peak and the Tour Noir. There seem, however, to be several weighty reasons against this shifting of a well-known name.* The peak christened Aiguille de la Neuva is scarcely important enough to cause the transfer of the name of Col de la Tour Noire, which has hitherto been universally recognised in Alpine history since the famous crossing of that pass in 1863.† Further, it is rather premature to give any name (that of Col du Tour Noir is proposed) to the as yet untraversed depression between the Aiguille de la Neuva and the Tour Noir. Finally, as the original Col de la Tour Noire leads from the Argentière to the Saleinaz Glacier, while the new one would lead from the former glacier to that of La Neuva, such a complete transfer of names ought not to be made without the consent of the 1863 party, which does not seem to have been asked for. We are therefore inclined to demur to this proposed change, and all the more so because Mr. George (the survivor of the two gentlemen of the 1863 party), to whom a proof of this note was submitted, writes as follows:— 'I fully agree with you. I see no apparent reason for changing the

* A similar opinion is expressed by the Editor of the new volume of the *Jahrbuch des S. A. C.*, p. 408.

† See *Alpine Journal*, vol. i. pp. 274–288.

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name, nor do I see what business Swiss alone have to change a name which equally belongs to France. The more international a pass the more reason for leaving the first discoverers to decide the name.' (From an editorial note it seems that the Chamonix people speak of 'La Tour Noire,' and this name appears on Mr. Reilly's map; but Swiss climbers have always used the form 'Le Tour Noir,' relying on the analogy of the village of 'Le Tour,' 'Glacier du Tour,' &c.) The same party started next day (August 12) from their bivouac on the Jardin d'Argentière for the first ascent of the Aiguilles Rouges du Dolent (3,665 mètres on Mieulet's map), which rise to the south of the Col d'Argentière. Considerable difficulties were encountered in scaling the rocks on the western flank of the peak, particularly in traversing a deeply cut couloir, and later in forcing a way along a knife-like arête of rock. The summit was thus attained in 9½ hours (halts included) from the bivouac, so that on the return the bivouac was not regained till after 11 P.M. M. Barbey's article is very interesting and contains an account of some genuine Alpine researches in a well-known district. It is illustrated by a phototype of the La Neuva side of the ridge between the Mont Dolent and the Aiguille de la Neuva, and by a cut of the greater part of the Argentière side of the same ridge, while a sketch map (corrected from Mieulet's map) of the N.E. corner of the Argentière Glacier helps us to understand the exact topography of the region. To avoid confusion it may be noted that the name Darreï is now given (on the authority of the great Siegfried map of Switzerland) to a peak of 3,537 mètres, of which the first ascent was made in August 1885 by M. Kurz, starting from the Cabane d'Orny.* It is situated at a considerable distance N.E. of the Tour Noir (3,824 mètres according to the Siegfried map, 3,843 according to Mieulet's), and is not shown on Mieulet's map, while in Reilly's it is unnamed, but marked at the N. end of the great rocky ridge which divides the Glacier de Truzbuc (called Glacier Darreï on the Siegfried map) from the eastern arm of the La Neuva Glacier.

Two Notes on Early Mountaineering.—In Sebastian Münster's 'Cosmographia Universalis' (originally published in 1543) there is, under the section 'Helvetia' (in book iii. 'De Germania'), a very full and interesting account of the Valais, with most curious illustrations. One chapter, 'De Insignioribus Montibus Valesiæ' (pp. 332–4 of the Basel edition of 1550), deserves the attention of climbers, for it gives a complete list of the passes leading from the Valais in every direction, from the Grimsel and the Furka to the Great St. Bernard and the Gemmi. The following passages refer to glacier passes:—

(1) *Gries and Nüfenen.*—'Per Gries et Nyfi patet iter ad Eschenthal [Val d'Ossola], quæ vallis est de ditione Mediolanensi.'† Since the Nüfenen leads into the Val Bedretto, as the upper part of the Val Leventina, or Ticino valley, is called, we must suppose that a second pass was also crossed, the Passo di San Giacomo, by which

* See *Jahrbuch des S. A. C.*, vol. xxi. pp. 156–163.

† Cf. Stumpf, *Beschreibung der löblichen Eidgenossenschaft*, p. 657 of the 1606 edition; Simler, *Descriptio Vallesiæ*, p. 43 of the 1633 edition.

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the Gries path down the Val d'Ossola is rejoined not far above Tosa Falls.

(2) *Monte Moro and St. Théodule.*—'A Vespa extenditur per montem Saser et ab alio latere per montem Matter, ad oppida quædam Mediolanensis ditionis, item ad vallem Kremerthal [Krämerthal is still the German name for the Val Tournanche] quæ paret comiti à Zaland [Challand].' *

(3) *Lötschen Pass.*—'A Raronia versus septentrionem et ad ditionem Bernensium præsertim ad Kandelsteg est quoque iter, sed periculosum, vocaturque mons ille transcendendus Lötschenberg. Aiunt in hoc itinere multos homines singulis annis perire, qui nive obruti in ipsâ nive suffocantur.'†

(4) *Col de Collon.*—'A Seduno duo opposita itinera ad septentrionem et meridiem extenduntur. Quod ad septentrionem ducit, montem Sanetsch transit, quod vero meridiem versus ducit transmittit per Vallem Urensem [Val d'Hérens] longitudine sex miliariorum, atque per magnum nivosum montem, qui major glacialis et Arolla vocatur, ad Vallem Wapelinam [Val Pellina] quæ ab antiquis Vallis Pœnina appellata est idque ob Hannibalem Pœnum quem putant per hanc vallem iter fecisse in Italiam. Subest autem hæc vallis dominio Augustæ Prætoriæ [Aosta], hoc est, comiti à Zaland [Challand].'

Stumpf (1546) and Simler (1574) mention the three former sets of passes, adding a few details, while Simler accurately distinguishes between the Gries and the Nüfenen; but Simler (p. 76) seems to pass over No. 4 in silence, while Stumpf (p. 663 *b*) only says that a pass lies over the glacier, not far from Mons Sylvius, into the Krämerthal or the Aosta valley.

On turning over the very curious and interesting pages of the first edition (1793) of Ebel's 'Anleitung auf die nützlichste und genussvollste Art in der Schweiz zu reisen' (the great Swiss guide-book of the days before Murray) I was considerably startled to read in the account of the Valley of Chamonix the following remarkable passage (vol. ii. p. 36), which I translate as literally as I can. It occurs in a description of the view from the Montenvers: 'Then follows the *Jorasse*, and still more to the south-west one catches sight of a very lofty and slender rock peak; this is the *Géant* or *Mallet*, which in 1786 was climbed from Courmayeur (which lies six or seven hours lower down) by an Englishman, under the guidance of *Maria Coutet*. Near the *Géant*, or the *Col de Géant*, M. de Saussure spent sixteen days at a height of 10,578 feet above the sea.' There is thus a clear distinction made between the peak and the pass, and I fancied for a moment that Mr. Graham and Signori Sella had been anticipated by nearly a hundred years. In the second edition of the book (1804, vol. ii. p. 191), however, this ascent is reduced to a passage of the Col du Géant, though the point visited is called 'the Géant,' and it is only in the French translation of the third edition (1810) that we find it distinctly called the 'Col du Géant.' It is, in fact, an allusion to Mr.

* Cf. Stumpf, p. 660, and Simler, p. 56.
† Cf. Stumpf, p. 661, and Simler, p. 62.

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Hill's exploit in 1786, the first recorded passage of the col by a traveller.* W. A. B. Coolidge.

Results of the New Italian Survey of the Eastern Alps.—In several recent numbers† we gave the results of the new Austrian survey of the Eastern Alps. The following list (taken from the 'Rivista Mensile' of the Italian Alpine Club for May 1889, pp. 136–40) contains the provisional results of the Italian survey of the Italian portions of that district, and serves both as a supplement and a contrast:—

	Mètres.		Mètres.
Königsspitze	3,860	Marmolata	3,344
Monte Cevedale	3,778	Cima di Vezzana	3,194
Monte Zebru	3,740	Antelao	3,263
Pallon della Mare	3,707	Tofana	3,241
Punta di San Matteo	3,685	Civetta	3,220
Thurwieserspitze	3,652	Sorapiss	3,206
Monte Vioz	3,639	Pelmo	3,169
Monte Saline	3,613	Monte Cristallo	3,153
Tuckettspitze	3,469	Zwölferkofel	3,095
Stelvio Pass	2,756	Drei Zinnen	3,000
Adamello	3,554	Marmarole	2,933
Lobbia Alta	3,418	Paralba	2,694
Lobbia Bassa	3,315		

The height assigned to the Cristallo (3,153 mètres) differs so much from that obtained by the new Austrian survey (3,199 mètres) that it has been suggested that the former figures really belong to the Piz Popena (3,143 mètres according to the new Austrian survey).

REVIEWS AND NOTICES.

The Alps. By F. Umlauft. Translated by Louisa Brough. (Kegan Paul, 1889. Large 8vo. pp. xii.–523. 25*s.*)

A full description and criticism of this work in its original German dress has already appeared in these pages.‡ It now comes before us in a well-printed English version. The translator informs us in her Preface that the text has been abridged in certain parts and that the very copious references in the notes to the literature of each branch of the subject have been omitted. Now the latter formed one of the most valuable features in the original, so that the abridgment deprives the reader of several valuable tables and of other useful details. In both cases the changes might be justified if the translator's hope that the work may appeal successfully to 'general readers' were to any extent realised; but we much fear that it cannot possibly be, for the only persons likely to consult this bulky production would certainly have

* See Mr. Freshfield's account of the pass (*A. J.*, ix. 22–4, where in the notes on p. 23 for '1793' read '1773,' and for 'i. 106' read 'iii. 106,' the passage in question appearing in the 1785 edition of Bourrit's work, not in that of 1781) and M. Durier's very full discussion of the subject (*ibid.* 87–9).

† *Alpine Journal*, vol. xiv. pp. 61, 252–3, 327.

‡ *Ibid.* vol. xiii. pp. 281–3.

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sufficient knowledge to wish for those very details which are now cruelly withheld from them. The illustrations and maps are simply copied from the German edition, except in the case of the general map of the Alps, which is not an improvement on Prof. Umlauft's, and contains mistakes as well as many oddly-chosen names. The translation of the text has clearly been made by one who has either no acquaintance or a very slight one with the Alps, for in many cases a statement which is vague in the German original becomes a positive mistake in the English version. Altogether, those who find it necessary to consult Prof. Umlauft's work had better resort to the German edition, with all its shortcomings, rather than to the English, which does not correct the errors and omissions of the original while adding largely to them.

Les Alpes et les Grandes Ascensions. Par E. Levasseur. (Paris: Delagrave, 1889. Large 8vo. pp. viii.–456. 10 francs.)

This sumptuously printed volume has been described as 'the French Umlauft,' and not without reason, though it possesses also both merits and defects of its own. The first book of M. Levasseur's work is devoted to an enumeration of the chief characteristics of the Alps, while the second deals with their topography. Both are, as they could not well fail to be, interesting and instructive. The former suffers from the common, though none the less deplorable, defect of vagueness, aiming at describing in rapid succession the geology, the hydrography, fauna, flora, roads, population, agriculture, scenery, climate, &c., of the Alps—all in eighty-four pages! M. Levasseur cannot be congratulated on having accomplished his well-nigh impossible task, though it is only fair to say that there are many isolated remarks of value scattered up and down these preliminary pages. It would be interesting to compare and contrast in detail the main divisions of the Alps adopted by him and by his German rival, but we have only space here to mention M. Levasseur's scheme. According to him, the Alps fall into three great divisions—the Western (from the Savona-Mondovi Railway to the Col Ferret), the Central (from the Col Ferret and the Lake of Geneva to the Brenner), and the Eastern (from the Brenner to the Plains of Hungary). We may quote the summary of this first book in the author's own words: 'Si nous voulions exprimer par un mot les principaux caractères qui distinguent aujourd'hui les Alpes et qui les distingueront probablement encore dans l'avenir, nous dirions qu'au point de vue de la géographie physique, les Alpes sont le RELIEF le plus accentué de l'Europe, et, en conséquence, un CHÂTEAU D'EAU qui alimente quatre grands fleuves. Elles sont et elles resteront, pour l'ethnographie, surtout une FORTERESSE; pour la politique, une BARRIÈRE; pour l'économie rurale, un PÂTURAGE; pour l'alpinisme, un GYMNASE; pour tous ceux qui aiment la nature, un PARC sans rival.'

The rest of the work is taken up with a minute account of the topography of the Alps, the main divisions being broken up into many smaller sections, each of which is illustrated by a rather roughly executed but, on the whole, useful special small-scale map. Now it has always seemed to us that it is a mistake from every point of view

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to give all these minute topographical details in the text of a general work on the Alps. Those to whom they might conceivably be of use would be persons who would certainly have the Ordnance maps of each country in their hands, and who might thus hope to be spared these terminable lists of names and figures in favour of a succinct topographical description capable of being grasped by non-specialists, and of being made interesting from a literary point of view. But M. Levasseur has not avoided this grave error of judgment, as we must consider it, any more than Prof. Umlauft. Further, if such minute details are given, it is of the first importance that they should be absolutely accurate and correct. Great fault has been found with the Eastern Alps section of M. Levasseur's work by those acquainted with that part of the Alpine chain; and the present writer is bound to say that the Western Alps section is filled with numerous and very bad mistakes of names and heights, as well as of topography pure and simple. The Central Alps section is probably not better than the others, though it takes in the best known part of the Alps. M. Levasseur deserves credit, however, for a very ingenious and, on the whole, well-executed scheme for relieving the strain on the attention caused by these endless lists of names and heights. He has secured the aid of various climbers (mainly French, but including a few members of our own Club), who contribute short accounts of their experiences on certain of the more conspicuous peaks included in each section. As was inevitable, the choice of the particular peaks to be thus distinguished, and of the writers who were to describe them, does not seem in every case all that could be desired, while the narrow limits of a page or two to which the articles are in each case confined cramp the energies of the several authors. But the idea is a good one, and it would be interesting to extend it by publishing a monograph on each group, with descriptions of the ascent of each of its great peaks by specially qualified persons. In such a case M. Levasseur's plan of luring his readers on to the study of topography by means of stories of adventure might be even more successfully worked out than in his present book.

To the larger edition of this work two Appendices are added. One of these deals with the history and present state of each of the chief Alpine Clubs or Societies (nineteen in number) now in existence, the writers having, as a rule, special facilities for collecting information on these points, and is one of the most important and valuable features of the book. Of the other Appendix we regret that we cannot speak in such favourable terms. It purports to contain a list of the chief books and maps relating to the Alps. That it is incomplete is no wonder, for Alpine literature is far more extensive than many persons imagine. But it is disfigured by such gross mistakes, misprints, and errors of every kind that not the slightest trust can be placed in it, and it must in a later edition be either entirely revised and remodelled, or else withdrawn altogether. Here are a few specimens taken quite at random: 'J. Simer, Vallis descriptio' (for J. Simler, Vallesiæ descriptio); 'D. W. Freshfield, Bye Comers in Savoy' (an article which appeared in these pages in 1884–5 under a rather different title: see 'Alpine Journal,' xii.); 'E. Whymper, The Ascent of the Wetterhorn:

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Londres, 1880;' 'Pritchard, Cramps in the Tyrol,' and so on. The entries are not arranged in any discoverable order, either of time, place, alphabet, nationality, or name. The section on maps is not quite so bad as that on books, but is far from good. In fact, this second Appendix is the weakest portion of the work, and greatly disfigures it.

There are about thirty illustrations (mostly poor and reproduced from worn plates), besides the forty-four rough special maps already mentioned. There are, besides, two larger maps, both well engraved and fair, despite some mistakes—the orography of the Western Alps, and the hydrography of Central Europe. A tolerably full table of contents is given, but, in a characteristically French manner, not the slightest attempt is made at an Index, the book contrasting in this respect very unfavourably with Prof. Umlauft's. The paper and print are all that can be desired, and the price is very moderate; but we fear that the book, as a whole, will not, at least in its present shape, become an 'Alpine Classic,' for its serious defects certainly outbalance its undoubted merits.

La Suisse Inconnue. Par Victor Tissot. (Paris: Dentu, 1888. 8vo. pp. 480. 3 francs 50 centimes.)

This is a brightly written book, the title of which is its chief drawback. M. Tissot has discovered that there is a Switzerland which is not that of M. Tartarin and of Mr. Cook; but then he falls into the grave mistake of imagining that he has visited it, for the districts which he describes are certainly far from unknown to English travellers, and probably not undiscovered even by M. Tissot's compatriots. He himself would scarcely contend that the journey from Paris by the St. Gotthard Railway to Lugano and Chiavenna (which fills the first hundred pages of his book) has anything to do with 'unknown Switzerland.' On the other hand, we cannot admit the justice of the name in the case of the Engadine, the Vorder Rhein Valley and the Valais, though the few pages on the Gruyère country, which bring the work to an end, have far more right to the title given to the whole book than any other part of it.

Apart from the question of title, the book is decidedly entertaining and worth reading. The excursions (with a solitary exception) described are of the mildest kind, but the sketches of different types of travellers are smart; while M. Tissot, being a Frenchman, could hardly fail to discover or imagine certain romances or intrigues among the travellers he came across. These tales of a traveller are undoubtedly amusing reading, and will serve to while away agreeably a few hours in a railway, when the reader may reasonably hope to have the same luck as the author. The 'Impressions de Voyage' seem to be all of recent date, except a description of the Lötschthal, written in 1868, when the curé of Kippel still lodged the rare visitors to his unfrequented valley. The only description of a climb is that of the ascent of the Dent Blanche in 1886 by M. Tissot's fourteen-year-old son, accompanied by two Evolena guides who had never been up the mountain. The father was for some time under the impression that

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the Dent Blanche was the Dent du Midi of the district, and when it flashed on him that it was something quite different he behaved as might have been expected. The boy's narrative is very fresh and pleasant, but, of course, betrays his inexperience at every step. The account of the 'Medicine Woman' of Hérémence is a good specimen of M. Tissot's style and manner.

An English translation (fairly done and slightly expurgated) of the twelfth edition of the book has just been issued by Messrs. Hodder and Stoughton (6*s*.).

Das Dachsteingebiet: ein geographisches Charakterbild aus den Oesterreichischen Nordalpen. Von Friedrich Simony. Part I. (Vienna and Olmütz: Hölzel. 4to. To be completed in four parts at 9*s*. each.)

Dr. Simony has, we believe, explored the Dachstein—the chief summit of the Salzburg Alps, though only 9,830 feet in height—during a long series of years, and he has undertaken the publication of the sumptuous work, of which Part I. is before us, with a view of advancing the cause of geographical science. He maintains, and we think rightly, that whereas the geological, zoological, and botanical characteristics of a district can be determined from a few specimens collected on the spot and preserved in a museum, those of the scenery of the district, regarded apart from its purely picturesque aspects, and rather as the field of operation of powerful natural agencies, cannot be grasped so easily because of the costly nature of journeys or of photographs of its main features and the impossibility, from a scientific point of view, of trusting to any less accurate representations. Hence he has determined to produce a monograph of a special district which shall illustrate its main physical features in minute detail, and thus make it possible for teachers and for students to see the actual working of great scientific laws, and this without entailing on them the expenses of a visit to the spot, or of gathering together a set of photographs of which, however, a complete and exhaustive set can never be obtained. He has naturally chosen his own special group of mountains, and certainly Part I. of his work promises well for the rest. It contains twenty-four pages of letterpress in which twelve photographs are printed. There are, besides, twelve phototypes, six fine heliotypes, and two large folding outline photo-heliographs (with keys to the names) of the group, all printed on separate sheets, so that they may be bound up in an atlas when the work is complete. Each of the four parts is to contain a similar number of illustrations. The views of the 'Karrenfelder' are very curious and striking, but those from the peak—despite a small glacier with one or two crevasses in it—are not very impressive. The material execution of the work is admirable, and we trust that the veteran author will obtain such support in his arduous undertaking that his long-continued efforts may be crowned with success.

Leggende delle Alpi. Da Maria Savi-Lopez. (Turin: Loescher, 1889. 8vo. pp. 358. 5 francs.)

Signora Savi-Lopez published in 1886 a book on the legends and folklore of the valleys of Lanzo. In the volume of the 'Bollettino

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del Club Alpino Italiano' for the same year she gave to the world some further treasures from her stores, dealing with the Alps as a whole. These she has now reissued, with many additions and improvements, in the prettily printed volume before us, which is adorned by sixty illustrations of a quaint character. The space at our disposal will not allow us to do more than mention the headings of some of the more important chapters in this work. Demons, dragons, ghosts, sprites, water spirits and snow-queens, flowers and forests, witches and accursed people—all pass before our eyes with the curious tales and stories told of them by the mountain folk. Lakes and castles, the longing after the earthly paradise, and real historical events have also been drawn into the net skilfully thrown by the authoress, who has consulted many books in search of information. The result is a work which very usefully supplements our knowledge of the dwellers of the Alps, for if there is one subject on which they are particularly reserved and shy, it is their beliefs and superstitions. Legends they will tell freely enough, but their own firm trust in the present activity of spirits, good and evil, is a matter of which they are half ashamed, half afraid to speak. Hence any mountaineer who has a taste for folklore, and the gift of inspiring confidence in his guides or other mountain friends, may find much in Signora Savi-Lopez's book both to interest him and to set him in the right way for supplementing it, and thus adding to the materials of the 'folklorists' who, despite their barbarous name, are engaged on an important task, and one which shows how largely the real beliefs of modern men are directly based on those of their remote ancestors.

Der Beobachter. Von D. Kaltbrunner und E. Kolbrunner. Second edition. (Zürich: Wurster, 1888. 16*s.* 6*d.*)

This is the second German edition of a very useful and complete work which appeared in German in 1882, and in French, as the 'Manuel du Voyageur,' in 1879 (see 'Alpine Journal,' x. 285). It has been thoroughly revised and enlarged from 762 to 904 pages, though the price is very nearly the same. Great stress is laid in the Preface on a set of questions for use by travellers in wild countries, which seems in some way to have dropped out of our copy. The new edition is illustrated by 270 figures in the text, and 26 diagrams, is clearly printed, and contains a vast mass of information intended as hints for explorers, but which may also be of great service to stay-at-home people, by enabling them to systematise the results of their study of books of travels. After an introductory section dealing with the preparations for undertaking the exploration of an unknown or little-known land, come the two main parts into which the book is divided. One—'The Land'—deals with topography, geology, commercial and agricultural geography, climate, hydrography, botany, and zoology. The other—'The People'—deals with the question of the census of the population, races, dialects, manners and customs, beliefs and religion, dress, food, houses, social life, family and State organisation, laws, justice, and finances, industry, commerce, literature, art, and history. Nor should we pass over without mention the various useful tables of weights, measures, and coins, as

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well as for facilitating trigonometrical, barometrical, thermometrical, and psychrometrical observations, which are placed at the end of the volume. The headings are numerous, but the matter is very clearly though concisely put, and in many cases the information may be of as great profit and use to the explorers of mountains as to the explorers of plains, for whom the work is primarily intended.

Unglücks-Chronik. Von J. Wenger. (Bern: Rudolf Jenni, 1888. 2*s.*)

If anyone desires nightmares and bad dreams let him at once purchase this small but grisly volume, and read it just before going to bed. In the space of 150 octavo pages it contains a summary list of all the great horrors causing loss of lives or property of which the earth has been the scene, beginning with the destruction of Sodom and Gomorrha, and coming down to the spring of 1888. Earthquakes, tornadoes, floods, landslips, avalanches, tempests, famines, plagues, fires, war, cannibalism, religious persecutions, despotism, lunacy and crime generally, colliery explosions, railway accidents, panic, drunkenness, hot climates—each finds its place in carefully arranged chapters. Chapter III., on landslips and avalanches, falls alone within our jurisdiction, and seems fairly complete. Certainly it may be convenient to have at hand the dates of all these terrible calamities, and probably the advance of science has diminished the chances of their recurrence, but one cannot help shuddering at the calm grimness with which the writer tells us that his object is to 'call attention to the enormous influence exercised, *in a negative sense*, by such events on the material and moral progress of the world.'

PROCEEDINGS OF THE ALPINE CLUB.

A GENERAL MEETING was held on Tuesday, May 7, 1889, at 8 30 P.M., Mr. C. T. DENT, *President*, in the chair.

Messrs. A. D. CARLISLE and B. J. M. DONNE were elected members of the Club.

The new cabinet, containing a complete collection of the late Mr. W. F. Donkin's photographs, which had been ordered in accordance with the resolution of the General Meeting of December 18, 1888, was shown, and received general approval.

The PRESIDENT announced that Sir Joseph D. Hooker, C.B., F.R.S., &c., had been elected an honorary member of the Club; also that Mr. B. J. M. Donne had kindly presented the Club with two of his water-colour drawings lately exhibited at the Club rooms, and the thanks of the meeting were unanimously voted to Mr. Donne for his valuable gift.

The HON. SECRETARY mentioned that the committee had lately been able to acquire about sixty back numbers of the 'Alpine Journal' (ranging from No. 58 to 101), many of which were quite out of print, and only to be obtained with great difficulty; and invited members desirous of obtaining any of them to apply to him.

Mr. G. YELD then read his paper on 'The Grand Paradis by a new

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route, and other New Expeditions in the Mountains of Cogne,' which was later printed in the May number of the 'Alpine Journal.'

The Rev. W. A. B. COOLIDGE opened the discussion on Mr. Yeld's paper, urging members to visit the district more frequently, and calling attention to the interesting climbs and to the magnificent views it affords, particularly of the Zermatt and Chamonix mountains. Mr. G. P. BAKER referred to the ascent of the Grivola by the N.W. arête, which he considered a better climb than the Schreckhorn. Mr. E. S. KENNEDY expressed the hope that members visiting the Graians would pay some attention to the geology of the district. A carboniferous formation commences in the valley of the Rhone, and between Mont Blanc and the St. Bernard it crosses to the valley of Aosta and beyond, and he hoped that fossil deposits would be found on the Graian Alps.

Messrs. C. E. MATHEWS, D. FRESHFIELD, A. L. MUMM, and the PRESIDENT also spoke, and the proceedings terminated with a cordial vote of thanks to Mr. Yeld, who briefly replied.

A GENERAL MEETING was held on Tuesday, June 4, 1889, at 8.30 P.M., Mr. C. T. DENT, *President*, in the chair.

Messrs. W. A. P. BURNELL and H. CHICHESTER HART were elected members of the Club.

The PRESIDENT announced that Signor Vittorio Sella, who had come over from Italy on purpose to arrange the magnificent collection of his photographs now on view, had presented the Club with all the large photographs exhibited, and a most cordial vote of thanks was accorded to him by acclamation.

Mr. J. G. COCKIN read a paper on the 'Ascent of Ushba.'

The PRESIDENT, in inviting discussion on the paper, introduced to the meeting Dr. G. Radde, Director of the Museum at Tiflis, and an honorary member of the Club, and Mr. Peacock, H.M. Vice-Consul at Batoum, to both of whom the Club was largely indebted for the great assistance members travelling in the Caucasus had received from them.

Mr. CRAUFURD GROVE considered that Mr. Cockin, in his account of his ascent of Ushba, had unduly minimised the great difficulties of the climb. He thought, and everyone who had seen the mountain would agree, that Mr. Cockin had accomplished one of the most difficult ascents in the world. He asked whether Mr. Cockin had been able to ascertain which of the two peaks of Ushba was the higher. Proceeding to speak in French, Mr. Grove expressed his pleasure at meeting Dr. Radde, and spoke of his great achievements as one of the earliest explorers of the Caucasus.

Dr. RADDE, also speaking in French, thanked the meeting for the cordial reception accorded to him. He considered that the principal work in the mountains of the Caucasus had been done by members of the Alpine Club, but he looked upon what had been achieved simply as a beginning, and called attention to the hitherto unexplored mountains east of Kazbek—the range of Tebulos-mta with the Azunta Pass, the mountains of the Chewsurs and Tusches, Kvavlos, Diklos, and Katsha,

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the Bogos range, the Alps of Daghestan, with Schalbus, Basardusy, and Schah-dagh; finally Karabagh, with the volcanic mountain Kapud-shich. His own explorations had taken him only to the limits of vegetation, which, however, in the Eastern Caucasus and on Elbruz extended to a very great height—12,000 feet and upwards. Travelling in these mountains would always be found very difficult unless the explorers were provided with the necessary introductions, and he would always be happy to assist any member of the Club to the best of his ability.

Messrs. TUCKER and PEACOCK concurred with Mr. Grove as to the great difficulties which the ascent of Ushba must involve.

The PRESIDENT thought it a pity that Ushba had been compared with the Matterhorn, as both mountains had characteristic and distinct features of their own. The first view of Ushba from the Betsho valley was quite unique; it was the finest rock peak one could wish to look upon. As to the difficulty of the climb, that must vary considerably according to the season; he thought the mountain could only be climbed when there was much snow on it. Caucasian rock peaks were apt to be extremely dangerous, owing to the rotten condition of the rocks, and stone avalanches were frequent. He considered Mr. Cockin's ascent one of the most remarkable feats of mountaineering ever accomplished, and concluded his remarks by moving a hearty vote of thanks to Mr. Cockin for his excellent paper.

The vote having been unanimously accorded by acclamation, Mr. Cockin briefly replied, still maintaining that he had found the ascent not very difficult, no doubt owing to the great quantity of snow on the mountain, although sometimes dangerous. As to the relative height of the two peaks, he could form no opinion, as they had been in the clouds nearly the whole time.

An interesting collection of Alpine photographs by Signor Vittorio Sella, and some oil paintings by Signor J. Micocci, were on view at the Club rooms on this and some subsequent days. (See p. 403.)

THE ANNUAL SUMMER DINNER was held at the Star and Garter Hotel, Richmond, on Friday, June 14, the President, Mr. C. T. DENT, in the chair. Forty-three members and their friends were present.

Postscript.

AT the last moment before going to press we learn, with deep regret, of the sudden death of one of the honorary members of the Club, Sir F. O. Adams. This occurred on July 20 at Grindelwald, shortly after his return from a mountain excursion. Sir Francis resigned in 1888 the post of British Minister to the Swiss Confederation, which he had held for several years, and it was in recognition of many courteous services rendered during that time to English mountaineers, as well as of his enthusiastic love for the mountains (despite his 63 years), that he was elected an honorary member of the Club. Only last spring he published, together with Mr. C. D. Cunningham, an elaborate work entitled 'The Swiss Confederation' (Macmillan).

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Maglich seen from the Drakosh.

from a photograph by M. de Déchy (24. June 1888)

Heliogravure F. Blechinger Vienna.

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THE

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The Ascent of Maglich.

By MAURICE DE DÉCHY.

IT was in the year 1888 (once in the spring and again in the autumn) that I visited for the first time a mountain district in the east of Europe which, possessing a strange fascination of its own, and a colouring which is already Oriental, yet by its hills and valleys calls to mind the marvellous beauty of the Alps. The railway had carried me swiftly through the smiling valley of the Bosna to Serajevo, the capital of Bosnia. The cliffs of the numberless peaks, which form a semicircle round the town, were reddened by the rays of the evening sun, while the slender white minarets of a hundred mosques, rising above a wilderness of houses, glittered in the same brilliant light. Some hours later, from a hillock not far from the highest point of the carriage-road over the Ivan Pass, which leads from the river basin of the Bosna to that of the Narenta, there arose before me a mighty mountain chain—the Prenj Planina *—crowned by a long line of bold rocky pinnacles, which were surrounded by snow-fields of dazzling brilliancy—a picture like those I have so often gazed on in the limestone ranges of Tyrol and Bavaria. I was not alone on this journey, for I was accompanied by Emile Rey, of Courmayeur, who is well known to my readers. To both of us this wonderful spectacle was a revelation—not perhaps so much because we were unaware that the scenery of the district was fine and interesting, but rather because we were unprepared for the great scale and the alpine character of the Alps of Bosnia and the Herzegovina. Now we looked forward with delight to many pleasant days of wanderings through these splendid mountains.

* 'Planina' is the local name for a mountain *massif*.

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We made our first excursion into the group of the Prenj Planina, ascending the very next day (June 10), the peak nearest at hand, a broad-topped summit, which rises above a tremendous rock-wall, and which, seen from the Ivan Pass, is of most striking appearance. The new ordnance map names it Cetinje, and assigns to it a height of 6,825 feet. This visit to the Prenj Planina having been a beautiful introduction to our explorations in the Alps of the Herzegovina, I now felt strongly drawn towards the southern parts of the district, where rise the highest summits, seen by us in the blue distance from the peak we ascended. These form two ranges, which run parallel to each other, and in a N.W. direction, through Bosnia and the Herzegovina, and finally melt into the Alps, of which they form the last S.E. spur.

Our way lay along the upper course of the Narenta as far as Ulog, and then over the Obrnje (whence beautiful views are gained) and the stony plateaux of the Morenje to the Gackopolje.* These lofty cretaceous limestone ('Karst') plateaux, the surface of which has been curiously moulded by the powerful action of water and air, cover, in the Herzegovina, a vast extent of ground, and are typical of this country. The elevated plain of Gacko (2,150 feet) is shut in by the two parallel ridges which, as mentioned above, stretch from Montenegro towards the N.W. It is a strange region of broad, treeless, generally barren plains, surrounded by a circle of low-looking grey-coloured hills which open out like a wide door in the Duga Pass (2,035 feet) to the S.E. This plain is watered by the Mushica, one of those remarkable rivers which vanish utterly in the fissured plateaux, and are characteristic of the Herzegovina. It is formed by the springs in the Chemerno range, swelled by numerous affluents, and disappears after a short course in the clefts of the Bjelashica Planina.

Gacko—the ancient Metokia, and the scene till recent times of those bloody feuds which throve for centuries in these parts—was a pleasant halting-place for a day. On June 19 we found ourselves again on the watershed between the Adriatic and the Black Sea, on the Chemerno Pass (4,400 feet), and we were now quite close to the main objects of our journey. From this pass the traveller sees a broad and lofty wall—the Volujak *massif*—the highest summit of which, the Vlasulja, attains the height of 7,674 feet. On

* From Gacko there is an excellent highroad to Nevesinje and Mostar.

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the right rises the arête of the Lebrshnik (6,099 feet), the spurs of which come down to the track over the pass, while between these two ranges tower the picturesque cliffs of the Kuk (5,961 feet), a most remarkable rocky fortress.

We had reached the pass by traversing the dreary, stony slopes above Gacko, composed of chalk clays, marly slates, and cretaceous limestones, and we were, therefore, all the better pleased by the grateful sight of the meadows on the Chemerno plateau—a large zone of Flysch—which form, as it were, the pedestal on which stands the great *massif* of the Volujak. It was a glorious evening, and the mighty wall of jurassic and triassic limestones, frequently streaked by snow-bands, was tinged alternately red and gold by the sun. A light mist floated over the gap in the mountain range, which marked the position of the gorge through which the Sutjeska—formed by the union of the streams rushing down from the other side of the plateau—forces its way to the Drina.

On June 20 we climbed the Vlasulja, which is in the very centre of the grandest scenery of the Bosnian and Herzegovinian Alps. From the S.E. the main chain stretches in a mighty semicircle towards Maglich (7,831 feet), the culminating point of the Bosnian and Herzegovinian Alps. The steep rocky walls of Maglich rise rather to the N. of the main mass of the Vlasulja, to which it is joined by a ridge running towards the S., which on its way bends now to the W. and now to the E. From this chain radiate, in a parallel direction towards the N.W., a number of rugged minor ridges, the crests of which are of nearly uniform height. Through these lateral ranges the waters of the Sutjeska run at the bottom of deeply-cut defiles, which offer a succession of magnificent scenes, amidst which we passed the day after our ascent of the Vlasulja.

The descent from the Chemerno plateau takes the traveller first to the opening of the valley through which runs the Sucheska, the chief source of the Sutjeska. The broad Sucheska glen rises by a succession of plateaux up to the main chain, the crags of the Kuk forming the most conspicuous object at the upper end of the valley. Lower down, and before one reaches the bank of the stream in the valley, now becoming narrower, one is astonished by a glimpse of a fine rocky peak rising above the forest-clad slopes of the lateral valley of the Jabushnica, which joins that of the Sutjeska at Grab. A more complete view of the dense forests of this side glen is obtained from a spur, over which the path climbs, on the right bank of the Sutjeska.

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After passing Grab we approached the mountain wall (having the Sedlo peak on the right, and the precipices of the Tovarnica on the left), which seems to shut in the head of the valley, and passed by through the great gate of the Prosjechenica Vrata, which has been pierced by the stream of the Sutjeska. There is scarcely room, besides the waters of the river, for the small path between the walls of the gorge, which are barely fifty paces apart. While the evening sun still gilded the cliffs above, the dank gorge below was already in deep shadow. On the left hand, in particular, the bare rock precipices were terribly grand, and descended nearly perpendicularly to the stony bed, along which bubbled the clear waters of the stream. This gate once possessed its 'keeper' or 'guardian,'—'Vratar in Sutiska,'—a name given in fifteenth-century documents to the castle, the ruined walls of which can still be seen on the edge of a cliff of the Volujak. Opposite this castle, and on the left bank of the stream, there was another smaller one perched on a projecting spur. Duke Stephen (1435–1460) established a customs station here, and bitter complaints were made by the men of Ragusa of attacks made by its occupants on the silver treasure which was being transported by the merchants of that great town. Both castles were hewn out of the living rock, and accessible by a rugged path along which one person only could pass at a time. A couple of men, armed only with boulders of rock, could easily hold this defile against a whole army, and it was also customary to bar the way by means of a huge iron chain.*

We then passed through narrow defiles, the rock-walls on

* The Austro-Hungarian Government contemplates the construction of a carriage road from Gacko over the Chemerno Pass and through the Sutjeska gorges as far as Fotcha, in connection with the main roads in Central Bosnia. Although this road will bring the mountaineers easily to the very foot of the great Herzegovinian range, and enable travellers in general to visit the most beautiful and picturesque scenery of the country in a comfortable way, it is intended in the first place to serve commercial interests. For even in the Middle Ages this route was extremely important, since—despite the descriptions which Ramberti (1533) gives us of the ill-treatment of travellers here, whether at the hands of custom officers, or of robbers pure and simple—the merchants of the Adriatic coast transported by it their wares from Ragusa to Bosnia, to Servia, and even to Constantinople, and it is astonishing to read how in the sixteenth and seventeenth century the French ambassadors to the Sublime Porte reached their destination by taking this route from the coast.

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either side now closing in, now opening out. Here and there wooded slopes relieved the barren rock scenery. The heights, composed of Dolomitic rock, were crowned by the most fantastic needles, spikes, and towers. The path crossed the stream repeatedly; the stream itself foamed far below, while high above hung slender bridges. At one spot, Suha (2,376 feet), where the valley opened out a little, hidden in a thick forest and overshadowed by the ghostly-looking limestone cliffs, there is a lonely white house, standing in quite the most striking position in these marvellous gorges. It is occupied by gendarmes, and here, as frequently in Bosnia and the Herzegovina, we took up our night quarters. Next morning I retraced my steps through the gorges for about 1½ hrs. as far as Grab, so that I might see them not only by the evening twilight, but in the full blaze of the sunshine, and might at my leisure take a number of photographic views. By midday we were back again, and set about making our preparations for the ascent of Maglich.

It was three o'clock P.M. when we left Suha—rather a large party in all. In the Alps of Bosnia and the Herzegovina the start for an ascent has its own special characteristics. First of all come the small mountain ponies, which can be made use of as long as there is any sort of a path. Then the local guides and porters, all attired in their picturesque national dress, afford a curious spectacle, while the importance and the unusual nature of the undertaking is shown by the presence of two gendarmes, who are assigned to the traveller by the authorities, to act partly as guards, partly as interpreters. All these men and horses make up an imposing cavalcade when it sets forth on its journey.

We turned up the narrow side glen, which opens out to the S.E. on to Suha, and is drained by the Sushichka stream. It is enclosed by the lateral ridges, which descend from the main chain in a N.W. direction, and are pierced by the Sutjeska. The ridge to the north of the Sushichka glen is called Prievor. The first bit of our way was level, and lay by the side of the clear stream; we soon found ourselves in a dense forest, and then began to climb up steep slopes, by means of the zigzags of the military bridle-path. We had first to reach the great rocky tooth, of which a glimpse could be had high above through the trees, standing out against the bright blue sky. Higher up gigantic fir-trees surrounded us. Great trunks of fallen monarchs often lay in a tangled mass across the path, and compelled us to force our way through the forest itself. Further

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on we went along the crest of a spur falling steeply on both sides towards wooded depths; and 2½ hours after the start we finally emerged from the forest. We found ourselves at the very base of the mighty rock wall of Maglich, towering up alone in solitary majesty, and crowned by two distinct peaks. We here looked on the broad side of the mountain, which is made up of a succession of terraces on the great wall, each defined by a sharp descending ridge. Not much snow can lie on this steep wall, which is furrowed by many broad débris couloirs coming straight down to the green pastures of the little Prievor plateau.

At a short distance in front of us, and amidst a few trees, stood the military guardhouse of Prievor, nearly on the crest of the Prievor ridge, and immediately at the foot of Maglich. It is one of a number which have been established along the frontier between Montenegro on the one hand, Bosnia and Herzegovina on the other, for the purpose of keeping watch and ward. We had been seen by its occupants, so that the sergeant in command came forward to meet us, and gave us a very friendly welcome. Prievor is the prettiest and cleanest guardhouse that I came across in Bosnia or the Herzegovina. We were conducted to the tidy room set apart for the use of strangers, which, with its wooden wainscoting, looked most inviting. The guardhouse is well provided with all necessaries, and by adding our supplies to what we obtained there, we managed to prepare a grand supper.

Before evening fell we strolled out to a hillock near the house in order to examine Maglich, and the route by which we proposed to ascend it. The sergeant in command of the guardhouse informed me that in order to reach the summit of the peak it was necessary to skirt round it towards the north, and near Ulobich, to reach its east slope, which was less steep than its other sides, and by which the summit could be easily reached. This was the route taken by the surveyors when constructing the ordnance map. However, I had not the slightest intention of taking this line; not only because it would have been necessary to go a long way into Montenegrin territory (and I did not wish to go there armed with my photographic apparatus), but because it involved making a very considerable circuit, and a direct route by the rocks of the N.W. face—not hitherto climbed—offered far greater interest. Rey and I saw at once that an ascent straight up from the guardhouse was relatively easy for persons accustomed to climbing in the Alps, but we had to consider,

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Chain of Maglich seen from Prievor.

from a photograph by M. de Déchy (24. June 1888.)

Heliogravure J. Blechinger Vienna.

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also, the porters, who were to carry the photographic apparatus, and our other native companions. So I settled on a route which, keeping to the right of the summit, aimed at gaining a notch in the rocks, and thence led up to the top over a small portion of the broad face of the mountain, which could not be seen from below. To the untrained eye the rocks of the central part of this route seem sufficiently steep and inaccessible, and we were repeatedly assured of the utter impossibility of proceeding in that direction. We contented ourselves with replying that we simply meant to try this route.

After paying all right and proper attention to the splendid rock wall of Maglich, we could not help admiring the fine mountain girdle which incloses the little Prievor plateau. From Maglich the range bends round to the Volujak group in a succession of steep walls, streaked with broad bands of snow. A jagged ridge, stretching on our right far towards the N.W., fell away sheerly on all sides. Below the semicircle which rose in the background were thick forests. There it was said that a lovely tarn reflected the mountains in its limpid waters, and certainly the formation of this cirque-like end of the Sushichka glen points clearly to the existence of a lake-basin.

Turning round towards the direction in which the mountain-wall opens out on either side, and where in shadowy depths the stream of the deeply-cut Sushichka glen flows to the N.W., the eye ranged over a wide prospect. On the other side of the clearly-distinguished channel of the Sutjeska one sees a number of lateral ridges descending from the main arête, the most conspicuous of which is the picturesque and precipitous Treshkovac. Undulating plains join each ridge to the other. The long-drawn evening shadows were thrown athwart them, and a grey mist hid more and more the wonderful variety in the shape of these ridges and also of their covering. A wooden cross and a small inclined scaffold crown the hill on which we were standing, and mark the resting-place of some Montenegrin brigand who had been shot here. Following out his thoughts, our head guide, a typical Herzegovinian in appearance, leant against it and reminded us that the mountain panorama unrolled before us stretches, far off, along the frontiers of Bosnia and the Herzegovina.

At 4.30 A.M., on June 25, our party quitted the guardhouse. It had been augmented by four men belonging to the garrison, so that ten in all began to mount silently over the

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meadows wet with a heavy dew. We steered straight for the wall of Maglich, and soon came to a gigantic slope of débris which surrounds its base, and which, owing to the constant motion caused by every step, was rather unpleasant to climb. We kept steadily in the direction that I had fixed on the evening before, and made for the gap in the ridge to the right of the summit of Maglich. Mounting obliquely over the débris slopes, and making steady progress, a short final ascent brought us in 1½ hours, at 6 A.M., to this gap. We then climbed along the side of a grassy buttress, something like a projecting pulpit, which on every other slope fell away precipitously. From this point we had a magnificent view of the mountain girdle which we had seen from Prievor, and which was now revealed to us in all its extent, the little lake shining far below.

After a short halt, of which I took advantage to photograph the scene, we resumed the ascent. Our way now lay over the broad side of the mountain, the rocks of which appeared undoubtedly to be rather steep, as they were much foreshortened. But we could see quite well several grassy ledges or shelves as well as the cliffs between them, and these made it possible to advance without hesitation. We had first to work through a chasm in the rocks. I grasped the firm rock with joy, while Rey remained a little behind to help up several of our companions with the rope. Then came grass slopes which led to a steep corner, where one had to climb up the rocks. Some of our men refused to attempt this bit, and made a great round in order to avoid it. I was delighted to follow Rey. An hour and a half later, at 8 A.M., we reached the broad top of the first peak of Maglich, where we met four Montenegrin frontier guards, who had watched our ascent with the greatest attention and amazement. Here we made a short halt, and then I ascended the second peak, which rose immediately behind us and was distinctly higher than the other. From below it took the shape of a fine and bold rock pinnacle, but after twenty minutes' climb I found myself on the summit, sitting by the great cairn built by the surveyors. It fell away steeply on all sides, and so gave one the impression—a perfectly accurate one—that it was a point which dominated every other hill and valley around. Close at hand one's attention was arrested by the savage splendour of Maglich itself, by the walls which fall in precipices towards Prievor, with their jagged ridges and many pinnacles, as well by the S.E. face clad with steep snow-slopes. The surrounding mountains, the chain running

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towards the Volujak group, the ridges stretching to the N. of this mountain mass—all displayed magnificent mountain shapes. The Sutjeska Valley was bathed in the clear sunlight, as well as the more distant Drina Valley far away towards Fotcha. The panorama unrolled before our eyes, indeed, extended to an immeasurable distance.

The day was beautifully clear, and all the peaks were sharply defined and distinct—the more distant seemed to melt into the plains, which as it were swam in the air. I felt an extreme pleasure in gazing on a sight at once so strange, so entrancing, and so rich in manifold forms of beauty. Far away rose up the summits of the Prenj Planina, with which I had become pretty well acquainted during my wanderings, and I joyfully greeted the peak whence I had for the first time seen the ridges and walls of Maglich. In the panorama there was a striking contrast between the bare grey plateaux and the dark forest, which became huger and huger as it stretched away in the N.E. towards the green fields of Bosnia. The meadows and pastures in all their glory of yellow and green were in bold relief against the pale limestone of the Planinas, on the crest of which glittered the silver of the snows.

Towards the S.E., too, a new world revealed itself. There was Montenegro, or the 'Land of the Black Mountain,' lying silent and dusky before me. High above the swelling plateaux, uncut by any deep valleys, with scanty forests and hardly any green covering, towered the mighty rock-wall of the Dormitor, crowned by a triple summit, and clothed in shining snow. A light mist lay along the horizon, blotting out all details of the distant view, and just allowing a glimpse of a glittering riband of water—the Piva.

I consider this view, which resembled a relief map far more than those usually obtained from summits in the Alps, to be entirely apart from the latter class of views, and this difference, which is already striking on all moderately elevated standpoints in the Bosnian and Herzegovinian Alps, even when the distant view is limited, is particularly noticeable in the case of the higher peaks. In Bosnia and the Herzegovina we have not the great alpine groups connected by high passes, or that array of peaks and ranges where the higher peaks in the background tower over those in the foreground and fill the horizon—but we do find in Bosnia and the Herzegovina mountain *massifs* separated from each other by wide plateaux, or by valley-like undulating plains, each group being built, as it were, several stories high, bare grey walls,

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of which the crests vary little in height, and no conspicuous detached summits.

I spent four happy hours on the two summits of Maglich, now making observations or photographing, now drinking in the beauty of the scene. It was pleasantly warm on the top, and even at midday a delightful breeze tempered the burning rays of the sun. My companions remained on the first summit, lying on the scanty grass which covered it, and making fierce attacks on the provisions. A small chamois slunk past, but the Montenegrins at once pursued him amid the rocky ridges of Maglich, and finally succeeded in killing him, for these sons of the mountains have a steady aim and a keen eye. Before we started downwards I took a photograph of the whole party, amid a perfect blaze of guns and bayonets, cutlasses and sabres, with the peak of Maglich in the background; and anyone looking at this picture will scarcely believe that this party of men, armed to the teeth, had come up to the summit of Maglich with a peaceful object in view—the advancing of the knowledge of one of the last spurs thrown out by the great chain of the Alps.

It was noon when we started for the descent, our immediate destination being the little lake already mentioned, which I desired to visit and to photograph. Had it not been for this wish of mine, Rey and I would gladly have parted from our companions and descended straight down the rocks to the Prievor plateau, for this route is, as we judged from below and saw clearly from above, quite feasible. It would certainly take a shorter time than the route by which we ascended, and I have no doubt that those who repeat the ascent will, if they are experienced alpine climbers, be unable to deny themselves the pleasure of accomplishing this short scramble up the rocks of Maglich.

We followed the crest of the Maglich ridge to the S., scarcely descending at all, until we reached a point which is immediately above the lake, and near which the wall rises behind it. Hence we enjoyed a most enchanting view of the lake lying in a deep hollow at our very feet. The slopes fell steeply down towards it, composed partly of débris, partly of snow, all grey and white, and blinding in the glare of the sun. Below everything was green, and the waters of the lake a deep blue. The descent was steep, but the snow-slopes were still hard, so that Rey and I slid joyfully down them, while our companions watched us, at first with fear and wonder. By two o'clock we were on the shores of a typical little mountain lake. The walls rose

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majestically above it, whether in dark rock-terraces or brilliant snow-slopes, and were reflected in the still blue waters of the lake. The snow came nearly down to the shore, covered with luxuriant grass, while down the valley the splendid forest held sway. A tiny peninsula stretched out into the lake and formed a break in its perfectly oval form.

How a sheet of water lights up a landscape, and what a magical charm there is in a beautiful lake! I cannot resist the temptation: the water, coming from the snows hard by, is icy cold; our Herzegovinians declared that the lake is accursed, the abode of evil spirits which draw men down into its depths, or ensnare those who try to spy them out in their mysterious dwelling-place; but all their remonstrances were in vain, I could not resist, and a few instants later I, and then Rey, were cleaving our way through the icy water.

Before leaving this lovely lake I took a photograph of this pearl of all the beautiful mountain scenery in Bosnia and the Herzegovina. Then traversing the forest we came, after a short descent which marks one of the valley terraces, to a second basin in which only a little water remained. To the left the rock-wall came down nearly perpendicularly to this second lakelet.

We were now in the uppermost part of the Sushichka glen, and had to leave the impassable bed of the stream for the slopes on the right hand, in order to climb up again to Prievor. This ascent lay partly through the forest, but mainly over débris, up which a faintly marked track (which we failed to find at once) led, under a burning sun, in 1½ hours from the lake to the crest of the Prievor ridge, where we caught sight of the pleasant guardhouse, lying in the shade of the forest.

Next day, instead of returning to Suha by the same way we had taken coming up, we left Prievor about noon, and made a bend round to the head of the Peruchica glen, which descends to the Sutjeska parallel with the Sushichka glen. On reaching the level of the former glen, in the midst of dense forests, we followed the stream—then very nearly dry—and mounted the right-hand or N.E. slope of the valley, in order to gain the notch known as the Drakosh Pass (4,213 feet). In about two hours from Prievor this point is gained, and a beautiful view of Maglich bursts upon the traveller. From this side its isolated and commanding position can be well realised. By a strange effect of light—the sun was high in the heavens, and shone straight down on the rock-wall—the

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rock and snow seemed to melt into one another, all details being indistinguishable, while the sharp lines of the two ridges of the final cone rose up all the more distinctly against the blue and cloudless sky. On the other side of the pass one looks down into the lower Sutjeska valley, whither the stream descends, after forcing its way through the great gorge. It was a smiling landscape, green and wooded, with groups of houses dotted here and there, amongst which the village of Tientistje, with the military guardhouse above, could be recognised.

We did not cross the Drakosh Pass to the other side, whence a short descent leads to Tientistje, but soon plunged again into the thick forest of the Peruchica glen. The faint path was lost and then found again. We steered towards the Prievor ridge, but we had a long way to go down. Crossing the valley and several brooks, with hardly any water in them, we pushed on steadily. Then came a short pull uphill, but though the path was steep it was always in the shade of the trees of the great forest. Finally, we reached the crest of the Prievor ridge near the rock tooth, which on our way up we had found to be the point to aim at. As we issued out of the forest, the wonderful landscape to the north appeared again before us as though by magic. Then we ran quickly down to Suha, which was reached, in two hours from the Drakosh Pass, at 5 P.M. We did not take long to pack, and got under weigh pretty soon again.

A little beyond the small plain on which the Suha guardhouse stands the valley closes in again, and the path begins to rise. One more look backwards at Suha, and then we enter the last of the gorges. The path lies on the right bank of the stream, the foaming waters of which swirl round the base of the nearly perpendicular wall on the opposite side, which is of the usual Dolomitic colour, and is clothed with a few scattered trees only. Numberless roaring torrents dash down on the right-hand side to join their waters with those of the Sutjeska. At the end of the gorge we crossed the stream, and here a beautifully engineered bridle path leads upward once more. At its highest point, and before commencing the descent towards Tientistje, we halted at a sharp turn. On one side the eye ranged at will over the lower part of the valley, while looking back one gazed into the depths of the winding Sutjeska gorges, and over steep wooded walls, which we saw from top to bottom. A deep gully, stretching far back, and from the head of which springs a roaring torrent in a series of waterfalls, breaks through the

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walls, which higher up gradually open out. Through the cleft thus formed we catch sight of a rocky peak, which lifts itself high into the air. Twilight reigns in the gorges; the wooded cleft is filling with blue shadows, above which, lit up by the rays of the departing sun, the graceful outline of this solitary peak, all the brighter and all the better defined by reason of the sharp contrast between light and shade, stands out boldly. It is Maglich to which we are now bidding farewell!

Hints to Travellers.

When I contributed in 1888 a short note on my trip to Bosnia and the Herzegovina to the 'Oesterreichische Alpen-Zeitung,' the Editor, Herr H. Hess, gave it the title of 'A New Alpine Playground' and prefixed to it the following introductory phrases:—'An extensive mountain region, the splendid scenery—especially Alpine scenery—of which had hitherto been completely unknown, has been made accessible to travellers by the occupation of Bosnia and the Herzegovina. Austrian soldiers, after having put down by force of arms the population, which had become half-savage in consequence of a long period of anarchy, have constructed railways and roads, organised means of communication, and bestowed on this land, so sorely tried by its varying fortunes, the blessings of peace and of civilisation. A survey has been carried out under extraordinary difficulties and in an amazingly short space of time, and the map which is the result affords us accurate information about the country. Thus this region, which abounds in beautiful scenery, is now ready for the enterprising traveller, and for many seasons the charm of exploring an unknown mountain district and of conquering virgin peaks is secured to the mountaineer. The mysterious attraction of a yet unknown mountain world still holds good in the case of the greater part of these regions.'

Hitherto the information published regarding Bosnia and the Herzegovina has not in any way related specially to their mountain regions, so that not only have the impressions of my excursions therein some value in themselves, but they have been permanently secured for the world by reason of several hundreds of photographs which I was able to take, and which are faithful representations of the truth.

The principal objects to be visited during a journey in Bosnia and the Herzegovina fall (unless in certain special cases) under one or other of three heads—

1. The *mountain regions.* The districts best worth visiting are the Treskavica group (very rich in lakes and easily accessible from Serajevo, from which it is not very distant), the beautiful Prenj Planina (which can be taken on the way from Serajevo to Mostar together with the grand defile of the Narenta), and to the south the Volujak and Maglich groups (the culminating points of the district, at the base of which are the superb Sutjeska gorges).

2. In *Central and Eastern Bosnia* the roads over the Romanja

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Planina and the Hranjen to Rogatica and Vishegrad, as well as the upper valleys of the Drina and the Lim, are to be specially recommended to travellers. The valleys are particularly beautiful in these parts. Apart from certain barren and stony bits the magnificent forests of Bosnia are here seen at their best. The stream roars at the bottom of a narrow gorge, above rise the splendid woods, while from the ridges one gains beautiful views of the Herzegovinian mountains, and of Dormitor, far away in Montenegro. In the upper Drina valley the traveller will find splendid scenery, especially gorges with white walls resembling the cañons of America.

3. In *Western Bosnia* the neighbourhood of Jajce and the falls of the Pliva are one of the chief glories of the country. From a well-wooded mountain glen, at the head of which the Pliva forms several lakes, it then descends in many branches through the bed it has carved for itself in the rocks, and its foaming waters fall in a narrow cleft, the savage aspect of which forms a strong contrast to the peaceful aspect of the valley higher up. Both falls and the upper course of the river can be well seen from the opposite side of the valley. No waterfall in the Alps can be compared with the falls of the Pliva, so singular are they, and none, although greater as regards the quantity of water and the height of the fall, can be ranked above it for beauty and picturesque scenery.

So far as regards the conveniences for travel in Bosnia and the Herzegovina, they are certainly superior to those which existed 20 or 25 years ago in many valleys of Dauphiné and the Tyrol. Travellers will probably enter the country either from the north by way of the valley of the Bosna, or at Mostar, coming from the Adriatic coast, and will leave it on the opposite side. Brod, on the banks of the Save, is the spot where the lines from Vienna, Budapest, and Trieste unite, and from whence the railway runs to Serajevo. On the Adriatic coast Metkovich is the starting-point of the railway to Mostar and to near Konjica, the line being in course of construction thence to Serajevo, so that very soon there will be a continuous iron road right through the country. The excellent Austrian Lloyd steamers afford easy means of communication between Metkovich, Trieste, and the towns along the Dalmatian coast. Magnificent roads, generally supplied with a regular service of diligences, score the land in every direction, and a network of telegraph lines has also been constructed by the Government. In the chief towns there are inns which are up to the requirements of a not too exacting traveller. In the more exposed parts of the country, along the frontier, the traveller can now find shelter in the gendarmes' barracks and the military guard-houses, but soon the Austrian Government will provide shelter houses for travellers, like the Club huts of the Austrian and German Alpine Clubs in the Alps of the Tyrol, Salzburg, and Carinthia, and will doubtless be aided in so doing by the Alpine Societies of the Empire. Serajevo, Konjica, Mostar, Gacko, and Fotcha are the best headquarters.

As to papers, the traveller should take with him an ordinary passport, and for the present an official recommendation addressed to the local authorities would be of great service, although in case of

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need the authorities would readily provide any educated traveller with all he requires, even though he had no such letter with him.* An excellent and detailed map (on a scale of $\frac{1}{75000}$) is in process of publication by the Austrian Ordnance Office.†

I strongly recommend early summer as the best season for a journey in Bosnia and the Herzegovina, from about the middle of May to the end of June, or even earlier if they are approached from the Adriatic, for Dalmatia and its lovely islands will form an excellent introduction to the trip, and then as summer advances one can always proceed towards the cooler regions of Bosnia. In early summer too the meadows and forests are beautifully green, not having been yet burnt up by the sun, and there is snow on the peaks, which enhances their beauty and offers no serious obstacle to ascending them. Summer itself is generally too hot, except in the mountain districts. The finest and clearest days are said to come in the autumn, although in June—after a nearly rainless May—I myself experienced extremely fine weather, and in autumn, by September 20, came in for a complete change in the weather, with a more or less constant downpour of rain.

A knowledge of German is quite sufficient for a journey in Bosnia and the Herzegovina, though in the direction of Mostar and Dalmatia some acquaintance with Italian would be very convenient.

As yet Western civilisation has not destroyed the peculiar manners and customs of the inhabitants of Bosnia and the Herzegovina. Although these lands are physically not very distant from the Alps, and a short journey only is required to reach them, the traveller will enter a region which in every respect is a foreign one, and this only increases the pleasure of a visit. 'Here is' (as I said in my note in the 'Oesterreichische Alpen-Zeitung,' after my first visit in the early summer of 1888)—'here is a land which may be visited with profit by anyone, a land endowed with numberless natural beauties, and full of semi-Oriental characteristics; while the mountaineer may discover new routes, over many a precipitous rock wall and many a sharp arête, and so up numberless peaks which are either but little known or have as yet not felt the foot of man on their lofty crests.'

* For members of the Royal Geographical Society of London and of the English Alpine Club the writer of these lines would gladly procure from the Ministerial department in Vienna which has special charge of the affairs of Bosnia and the Herzegovina such letters of recommendation, and begs that all applications may be addressed to him through the authorities of the two societies named above.

† Any sheet of this map, as well as a key map, may be procured from Lechner, the well-known bookseller and publisher in Vienna (31, Graben), and may be seen in the map-room of the Royal Geographical Society, 1 Savile Row, W.

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The Search Expedition to the Caucasus.

By CLINTON DENT, President.

THE following lines are intended only as a brief summary of the results of the Search Expedition organised to ascertain the fate of Mr. W. F. Donkin and Mr. H. Fox, together with their guides, Streich and Fischer. It is almost impossible, without the assistance of a map, to give a really clear idea of the intricate topography of the district. Through the kindness of General Shdanoff, of the Topographical Department of Tiflis, and of Messrs. Djukoff and Bogdanoff, who have been engaged in the survey of this part of the Caucasian chain, good materials are to hand for the construction of such a map, but it has been impossible to prepare it in time for publication in the present number of the 'Alpine Journal.' At the meeting in February next, it is hoped that the map will be ready, and a fully detailed account of the search will then be laid before the Club. Meanwhile, the sketch-map already published in the 'Alpine Journal'* may give some rough idea of the mountain chain.

It is unnecessary here to set forth the grounds on which the general plan of the search was arranged. Suffice it for the present to say that we assumed that the party had carried out the intention expressed in Fox's diary of crossing the Ullu-auz Pass—as the depression on the E. ridge of Dych-tau, at the head of the Ullu-auz Glacier, may now be called—of camping out high on the southern side, and of then attacking Dych-tau again by the eastern or southern ridges. On August 27 they had, as we learned from the diary, attempted the ascent of Dych-tau by the northern ridge and had been repulsed, having started too late in the day for the expedition.

July 25.—Reached Karaoul, and were fortunate in finding M. Bogdanoff, of the Topographical Department, who was at work in the district, encamped there. He entertained us very hospitably.

July 27.—Heavy rain had fallen during the night, and there was some fresh snow on the mountains. Kaufmann, Woolley's second guide, ill with dysenteric symptoms. Did not like to leave him alone in camp for possibly several days, and consequently postponed our start. Woolley went off to explore the Tutuin-su glen with Jossi and Maurer,

* No. 101, August 1888.

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while Freshfield and Powell, accompanied by Fischer, started up the hill N. of Karaoul. Woolley on his return reported that the Tutuin stream branched a short distance up the glen. Freshfield from his view-point was enabled to see that the two streams came from different glaciers, and that of these the southern was the one that led towards Dych-tau. He reported also that the glacier had a formidable ice-fall, of which drawings were brought down. The Ullu-auz Pass was visible, immediately beyond a great buttress of rock. This reconnoitring walk was most valuable. The worst way to reconnoitre a mountain is to go actually on it.

July 28.—Original intention of starting at 1 A.M. abandoned owing to a communication received from Baron Ungarn-Sternberg late in the evening of 27th. Left at 5 A.M. Kaufmann remained at Karaoul. Freshfield and Powell rode down the valley towards Balkar to catch Baron Ungarn-Sternberg, returning after some hours, while we conveyed the baggage some distance up the Tutuin-su glen. Camped out in the open by the side of the Tutuin Glacier at a height of about 9,300 feet. The glacier is obviously advancing.

July 29.—Started at 4.30 A.M. Weather perfect. Ascent by rocks on right bank of Tutuin Glacier for an hour. Crossed glacier through ice-fall (which was not so bad as it looked, but we were lucky in hitting off a good line) to left bank. Scenery very grand. Pinnacles of rock in all directions resembling the Chamonix Aiguilles. Upper snow in good order. Soon came in sight of a col comparable to the Allalin-joch in its relation to the Alphubel, our pass being represented by the latter. Had it not been for the survey of July 27, we might have tried the wrong pass and lost a day. On rounding the buttress of rock already mentioned, came in sight of the true Ullu-auz Pass. Height of final slope from névé to summit of pass from 1,500 to 1,800 feet. A broad ice-gully leads up the whole of the way, but two ribs of rock on the right offered the best means of access. Chose the left-hand rib, it being rather broader and also running further up. If we had gone up the other we might have missed the bivouac altogether. Rocks fairly easy, but still requiring attention. We were climbing steadily up when, just about mid-day, Maurer, who was leading, half shouted, half gasped, 'Herr Gott! the sleeping-place!' A hurried glance up and we saw, some six or eight feet above the leader, a low wall of stones. In a moment we were all together within the little enclosure, or on the narrow ledge by its side. The

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suddenness of the discovery was for a few moments overpowering. We had felt certain that some such bivouac existed. We believed that we should find it. We knew for an absolute certainty that nothing more than evidence of a fatal accident could be obtained, and yet the blow came as if freshly inflicted.

The sleeping-place consisted of a wall of stones, carefully built, about two feet high, and of horseshoe shape. The circle was completed by an overhanging rock at the back. The enclosure measured about six feet across, and some eight feet in length. Carefully arranged in this space, and almost entirely covered by the snow which had drifted and fallen into it, we could just make out the sleeping-bags with two mackintosh coats spread over them. A little distance off, and buried also, was one of the green rück-sacks we had used last year. On the rocks just below were traces of a fire; all the wood gone. A cooking-pan half full of water was placed ready for use under a stone, and, close by, a loaded revolver hung from a projecting splinter of rock. There was a good store of provisions. No rope was to be seen. Donkin's camera too was absent. He had doubtless, according to his usual custom, taken it with him, intending to carry it as far as possible. I think none who were present will ever lose the power of recalling the scene in the minutest details. As we stood there the explanation of what had happened eleven months before was as clear as if we had found a written description. That they intended to return to the bivouac was evident. The party had unquestionably attempted to ascend Dych-tau by the eastern ridge, *i.e.* the ridge leading directly towards the summit from the Pass, for if they had proposed to try the route from the head of the Tutuin snowfields they would have carried down their baggage. This route—the one taken this year by Mr. H. Woolley—they never saw. The great rock pinnacles on the actual crest of the ridge allowed no passage, and it would have been found necessary to traverse on the face. The northern face is a series of forbidding ice-slopes. The southern face consists of cliffs traversed by small slopes and steep ledges covered with ice and snow. It is highly probable that a fall occurred while the party were on one of these slopes: if so, death must have been almost instantaneous. Falling stones could not have swept away so large a party, nor is there any particular danger from this source at the spot. Want of time alone must have prevented the party from reaching the summit by the very

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difficult route adopted. We therefore came to the conclusion that they were lost in ascending.

Freshfield and Woolley, with Jossi, went on, after a while, to the top of the pass and found a stone-man, but no record. Powell remained to sketch the scene, and the rest of the party set to work to dig out the various articles. Some of these were brought down. A packet of maps and sketches was found frozen in beneath the sleeping-bags, the bundle being carefully wrapped in mackintosh. On two or three of the drawings were indicated routes up Dych-tau. The height of the bivouac is about 14,000 feet, probably rather over than under, and that of the pass about 14,300 feet. The cliffs on both sides were carefully scanned with the telescope, but no traces of the calamity were visible. We returned to our sleeping-place at 7.30 P.M., and the following day to Karaoul.

The actual ascent of Dych-tau did not appear necessary as far as the search was concerned, and the idea of this expedition was therefore abandoned. A visit to the upper snows of the Kundium Mishirgi Glacier from the Bezingi side seemed, perhaps, desirable in order to ascertain why Donkin and Fox's first attempt on the mountain had failed.

With this expedition the search was over. It is necessary to mention this, as a paragraph that appeared in the 'Standard' newspaper of September 18, which was extensively copied by the press, while ascribing to me some remarks that I never made, erroneously stated that some members of the party remained to conduct further search.

It has been assumed in some quarters that as none of the bodies were found the expedition failed in its main object. This rather morbid view has unfortunately, though perhaps not unnaturally, found expression in certain newspapers. Let me speak plainly, in the hope that it may be the last word on the subject. Such a discovery we feared, but did not hope to make. If we had found remains, we could not have brought them down through the ice-fall, not at any rate without much additional aid, which could not have been obtained from the natives. We wanted convincing evidence of the nature of the accident; this, in our judgment, we have brought to light. We wanted to clear the inhabitants of the district from the grave suspicion (one that we ourselves had never for a moment entertained) under which they lay; this we did, for no native could have even reached the bivouac. And, lastly, we wanted, on behalf of the Club, to redeem a promise and to discharge a duty. There are very

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strong reasons indeed for concluding that our friends lie in the upper névé, buried beneath the avalanche snow that fell during the last winter and spring. Those who know the mountains best will recognise that, in ignorance of the exact spot, further search in the snowfields at the base of the cliffs would have been utterly futile; none was made, at the time or after. Save for some chance discovery, we must wait until, twenty or thirty years hence, the downward movement of the glacier may conceivably reveal that the story we have founded on this circumstantial evidence is accurate. For my own part, I hope that the secret may be preserved.

Explorations and Ascents in the Caucasus in 1889.

[N.B.—Since 1887 the three great peaks of the central group of the Caucasus have been referred to constantly in these pages by the names given to them in the 5-verst map. M. Djukoff, of the Russian Survey, has, however, recently ascertained that the Dych-tau of the 5-verst map (and, consequently, of European literature) is locally called Koshtan-tau, and he has so called it on his new map, not yet officially issued. For this change there is much to be said. But M. Djukoff has further transferred the name of Dych-tau to the '5-verst' Koshtan-tau (Mr. Dent's Guluku). This appears a very unfortunate proposal. That peak stands quite outside the Dych-su basin, and the peak called Dych-tau by the Tartars is naturally that at the head of the Dych-su Glacier, the Shkara of Suanetia. Until a new nomenclature is definitely sanctioned by the Topographical Department at Tiflis that of the 5-verst map will be retained in these pages, with such explanation as may be needful.]

ON July 14 Mr. C. T. Dent and Mr. D. W. Freshfield, with Captain C. H. Powell, of the 1st Ghoorkhas (to whom, in order that he might be able to place his knowledge of Russian at the disposal of the search-party, extended leave of absence from his regiment had been generously granted, at the request of the President and Council of the Royal Geographical Society, by the Secretary of State for India), joined Mr. Hermann Woolley, who had already arrived with C. Jossi, J. Kaufmann, K. Maurer and A. Fischer, at Vladikavkaz (see p. 445).

The united party drove over the Mamisson Pass, sleeping at Allagyr and Teeb, to the Kasarma, 1,100 feet below the top on the southern side. Thence it is but a short walk of 1 to 1½ hour to the brow of the high pasturages to the W., which command a noble and topographically instructive view of the Rioń basin, the gorge through which the river breaks through the hills, and the S. face of the Adai Choch group with its glaciers.

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Ceja Pass.—On July 19 the party started from the Kasarma at 2 A.M., and, after recrossing the Mamisson Pass, left the road at the first zigzag. Ascending beside and over the glacier which feeds the source of the Ardon, they reached the crest by easy slopes about 8 A.M. The pass, which lies a few hundred yards E. of the point where the granite chain ceases to be the watershed, is shown on Monsieur de Déchy's photograph of the Ceja Glacier.* It is to the right (E.) of the rock-finger on the sky-line. The view in both directions was fine. A snow-peak lying behind the 'double-headed peak' of Mr. Freshfield's 'Central Caucasus' overtopped the Adai Choch of that book, ascended by Monsieur de Déchy.†

The névé of the Ceja Glacier was cut off by some 400 feet of very steep rock and ice, the descent of which took 4 hours, despite the help of some soft snow near the bottom, down which a ladder was kicked to the upper edge of a bergschrund, which was not beyond a jump.

The descent of the three ice-falls of the Ceja Glacier offered no difficulty (on their left side), and after a pleasant halt among white rhododendrons, followed by a long stretch of very tiresome moraine, the foot of the glacier was gained about 6 P.M., and the engineer's house at St. Nicholai, on the Mamisson Road, by 9 P.M. The forest and rock scenery of the upper part of the Ceja Valley, near the remarkable old shrine of Rekom, is bold and very romantic; and from the hamlets of Ceja (to reach which the path makes a long ascent) there is a fine view of the snow-peaks.

From St. Nicholai the party travelled through Sadon and Kamunta, and across three mule passes to the foot of the Karagam Glacier, in the Uruch Valley. From the last pass there is a noble view of the Uruch peaks and Shkara. They made a very beautiful excursion to the bivouac of the 1868 party on the Karagam Glacier, by the path leading to the Gurdzi-vsek (vsek = pass), which bore signs of frequent traffic. There is a good log hut near the end of the glacier.

On July 25, after an afternoon and night of pouring rain, the party crossed the Stule-vsek (9,500 feet). On the 27th preliminary explorations were made (see p. 433).

Ullu-auz Pass (14,350 feet).—On the 28th the party (without Kaufmann) bivouacked in a deserted kosh at the head of the Tutuin-su (a torrent which joins the Cherek 1½ hour below Karaoul), and immediately at the foot of the great

* *Alpine Journal*, vol. xii. p. 217. † *Ibid.* vol. xii. pp. 314–319.

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icefall of the Tutuin Glacier. The rocks on its right were easily climbed, and then the séracs were crossed from the right to the left bank without serious difficulty, and a way found through the upper crevasses. The névé of the Tutuin Glacier slopes gently between steep ranges of rock and ice. At its head are two terribly steep ice-troughs, and to their right (N.) a broad slope leading towards the S. ridge of Dych-tau. The Ullu-auz Pass does not become visible until a projecting crag has been passed. A long, steep bank of rock is then seen leading up from just above the bergschrund almost to the crest, and separated from the neighbouring cliffs by two broad ice couloirs. The rocks give good hold, and the ice- or snow-slope that has to be traversed to reach the pass is short, and not steep. The descent on the Ullu-auz side is at first by gentle snow slopes, and the séracs lower down appeared easily passable. Apart from the peculiar and mournful interest this pass must always possess, it is a practical and useful route leading directly from Bezingi *viâ* the Doumala glen to Karaoul. It commands a superb distant panorama of the chain eastwards on one side, and a near view of Dych-tau on the other. In combination with the Dych-su and Mishirgi Cols it affords a high-level tour through the central group. Late in the season, however, the Tutuin ice-fall may be impassable. In this case an escape might be found over a false col from the head of a snowy trench opening to the E. of the ice-fall, and communicating with the glacier which falls into the N. branch of the Tutuin, and is conspicuous from the Cherek valley.

On August 4 (thick fog in the valley discouraging the rest of the party) Mr. D. Freshfield ascended with Fischer the Mishirgi Glacier. The mist ceased at 8,500–9,000 feet. Climbing beside the avalanche tracks at the base of Koshtan-tau to a height of over 10,000 feet, they obtained a perfect view of the W. face of Dych-tau, and of the ground traversed by Donkin and Fox a few days before the fatal expedition in their first attempt. The peak is certainly accessible by the Kundium Mishirgi Glacier and the N. ridge. The principal difficulty would be in gaining the ridge, to do which it would be best to cut up a snow wall S. of a dome at the foot of the long rising crest. Fox and Donkin's guides appear to have attacked the rockribs on the W. face. The cirque of the Mishirgi Glacier is one of the most stupendous scenes in the Caucasus, and climbers should not be led to neglect it by the more obvious splendours of the Bezingi Glacier.

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Saluinan Chiran Pass (13,622 feet).—On August 6 the party left the Missess Kosh for the Saluinan Chiran (chiran = glacier) Pass. Mr. Cockin, who reached the top from this side last year, had stated in print that 'the descent seemed easy.'* The ascent by the left bank of the glacier and the rocks on the same side of the last ice-slope took 7 hours. The western view from the top was very fine, including the Leila, Ushba, and Dongusorun. But by far the most prominent peak was Tichtengee (15,134 feet) (Tiutiurgu of 5-verst map), which (completely masking Elbruz) towered above the lower portion of the great Shaour-tu Glacier, an ice-stream fed by a number of converging glaciers, and flowing, not, as represented in the 5-verst map, northwards into the Bulungu glen, but (roughly) W. to the Gara-su. The upper névé lay some 1,500 feet below, cut off by broken cliffs. On the left a small glacier hanging on the Saluinan Chiran peak (14,700 feet) impended over a steep ice slope. The rocks at first, while very loose and steep enough to require care, were not difficult. Lower down difficulties increased, and were greatly aggravated by volleys of stones, which as the sun struck the western slope fell with greater frequency. Their track could not be altogether avoided, and to avoid it at all involved hard climbing among the cliffs. In several places it was thought prudent to let down one traveller at a time. At last comparative shelter was obtained on the edge of the ice-slope, along which steps had to be cut. The bergschrund was not reached till 7.30 P.M. There lanterns were lit, as, though the moon was up, the route lay mostly in shadow. By keeping well to the right, past some Grands Mulets-like rocks, the upper fall of névé was avoided. After some hesitation at the junction of a large glacier from the N.E., it was decided by Maurer's advice to cross the right-hand moraine. Beneath it a series of snow slopes led down the hollow between the mountain side and the moraine. At last, on a bed of small granite pebbles, the party halted about 10.30 P.M. The weather was perfect. Starting again at dawn they reached in some 3 hours a kosh between the stream from their glacier and the Gara-su, flowing from the Thuber Pass, about 4½ hours above Chegem. Here they had the good fortune to encounter

* Mr. Holder (*R. G. S. Proceedings*, vol. xi. p. 365) is in error in stating that the Saluinan Chiran 'is not cut off by a rocky ridge from, but runs up to and forms a part of, the great snow-basin which extends to Tiutiurgu on the north-west.' The exact contrary is the truth.

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M. Djukoff, the Russian topographer, who took a leading part last year in the search. He was now camped at the junction of the Gara-su and Bashil-su, and engaged in mapping this part of the chain. The figures given above are from his observations. The Shaour-tu Glacier is well shown in some of M. de Déchy's photographs with the Saluinan Chiran peak and pass at its head.

It will be obvious from the above account that this pass cannot be unreservedly recommended. It can only be attempted with prudence early in the day, and from the W. side. The number of stones lying round the base of the wall (as well as the enormous moraines lower down) bear witness to the friable and treacherous character of the rocks, and the velocity with which they fall is deadly. There is apparently an easier and lower pass farther north, which might be reached from opposite the Mishirgi Kosh, or by a stream that falls a little higher on to the Bezingi Glacier.

Pass,* from Bashil to Adyr Valley (12,678 feet).—On August 9, Mr. D. W. Freshfield and Captain Powell, with Maurer and Fischer, went up to the head of the Bashil-su, and slept at the highest kosh (7,126 feet) on the left bank, not half a mile from the Bashil Glacier, and close to the point where a stream falls down steep rocks from an unseen glacier to the right (looking up the valley).

Starting next morning at 4.20 A.M., they reached, by a very steep ascent, in 1½ hour, a brow at the foot of this large glacier, which is surrounded by (in a Caucasian sense) comparatively low peaks. Looking back, the view of the whole head of the Bashil-su and its glaciers was magnificent. An ascent along the left-hand moraine of the glacier led to the foot of an ice-fall: here a choice presented itself between a circuitous but certain route on the left side, and a direct but speculative climb through the crevasses on the right. Maurer decided to speculate, and the party got through without serious difficulty, though not without delays, during which glorious views were enjoyed of the eastward chain. Tichtengee and the Saluinan Chiran peak and pass were backed by Koshtan-tau and Dych-tau, which show from here as brilliant pyramids, and entirely eclipse the too closely clustered summits south of the Bezingi Glacier.

After an upper névé fall had been surmounted easily by its right bank, the head of the glacier opened out, a wide cirque shut in by steep, low snow- or ice-walls and rocky crests,

* The naming of this pass is postponed until the new survey is completed.

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except to the S.W. (the climber's left), where a broad bay was discovered filled by névé mounting gently to a snow-ridge. This ridge was gained in 6½ hours (including short halts) from the Kosh. The view southward and westward was still unclouded and glorious. A noble rock-peak, with Mr. Mummery's passes at its base, stood up above the Bashil-su and at the head of the Gvalda. Close at hand, above the head of the glacier falling to the Adyr-su, was one of those inaccessible-looking pinnacles which are the glory of the Caucasus. Further distant Ushba, Dongusorun and the Shichildi peaks towered above the nearer crests. The range ended and culminated in the vast bulk of Elbruz, the snows of which shone all day with a peculiar golden radiancy. Two hours and a half were spent on the pass. The descent lay at first over broken rocks, and it was needful to cut across one or two ice-banks to reach the scree that ran down nearest to the glacier. At its head is a lower but much steeper pass, which may lead to a branch of the main Bashil-su Glacier.

The glacier is broad, straight, and gently inclined. Its general direction is N.E., or directly towards Elbruz, one of the finest possible views of which is gained from it. There are numerous smaller glaciers descending from the chain N. of the pass. When the ice becomes steep, an easy descent over moraine and rocks is found on the right hand. After traversing a wilderness of stones the first firs appear, and a well-marked track leads down into the valley of the Adyr-su, about 2½ hours' sharp walking above Urusbieh. Descent: left pass 1, reached valley 4.30, arrived at Urusbieh 7.30 P.M.

This pass is not the same as that crossed by Donkin and Fox in the opposite direction. Their ascent was, doubtless, by the same glen, but they must have taken one of the more northern glaciers, and reached the crest a little S. of the peak marked 14,273 feet on the R.G.S. map, and at a point overlooking a glacier which flows in a different (more easterly) direction to that of the one traversed this year. Its stream descends in a waterfall to join the Bashil-su at a large kosh (6,840 feet) ¾ hour below, and out of sight of, the head of the Bashil valley.

The pass described above has been used by hunters. Another over the glacier by which Donkin and Fox probably descended, but more to the N., is known in the country. It leads into the Tutu glen, which joins the Baksan below Urusbieh. Donkin and Fox's pass must lie between the two.

Achsu Pass (about 13,000 feet).—On August 11, Mr. D. W.

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Freshfield, Captain Powell, and Maurer, with a Urusbieh porter, went up to the Shichildi kosh, which is close to the glacier, and some 5 hours from Urusbieh. Starting next morning at 5 A.M. they scrambled over the extraordinary piles of rocks which cover the whole lower portion of the Shichildi Glacier, up to the point where its feeders unite at the base of the precipices of Shichildi-tau (see M. de Déchy's photographs). The cause of this extravagant moraine is to be found, not, as some scientists may imagine, in any particular boring efficacy in the Shichildi ice, but in a great rock-fall, which took place in the year 1866, in the range N. of the upper glacier, and between it and the Adyl-su. The western tributary is a remarkably clean ice-stream. Up this the course to the Ach-su Pass lies. A recess beside it, and above a lower ice-fall, offers a feeding-ground for 'tur,' or mountain-goats, a herd of which was met. The remainder of the ascent, which is long and steep, is along the true (left) bank of the principal glacier, flowing from a recess W. of Shichildi-tau. Except in one place, where rocks have to be resorted to in order to avoid crevasses and falling stones, the track lies up ice and snow, and is free from difficulty.

Three very fine rock-towers, buttresses of Shichildi-tau, are notable on the other side of the glacier. In place of making for an icy ridge seen from the wild goats' pasture, the track to the pass bears to the right up a steep bank of névé to a small plateau (very conspicuous from Elbruz) lying on the spur which limits the Shichildi basin to the W. From this the W. side of Ushba is seen. There appears to be a way from the saddle to the S. peak by traversing ledges on the W. face, and then climbing directly to the top. The pass itself is a narrow gap, at the extreme S.W. corner of the Shichildi basin, with no extended view except due S. A short ascent to the right, however, shows Elbruz and other summits. It is high, about 13,000 feet. The ascent took over 6 hours. It overlooks another pass at the further or E. extremity of the Shichildi Glacier, known to the natives as the Cheteen-tau, and leading on to the W. branch of the Gvalda Glacier. A third pass is possible at the immediate back of Ushba; the ascent is by very steep snow seamed with gigantic crevasses, doubtless sometimes impassable. Probably there is a double descent, right on to the W. glacier of Ushba, left on to the Mestia Glacier. There appears to be no known pass from the Adyl-su over the watershed; its heads are, to a great extent at any rate, overlapped by the Shichildi névé.

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The descent on the S. side of the Achsu Pass is, when a bergschrund has been passed, extremely easy. A succession of glissades down a narrow glacier, and then on snowbeds on its right bank, conducts to the valley at the foot of the Betsho Pass. It is a long day's walk from the Shichildi kosh to Betsho. The descent occupies about seven hours, but is too varied and beautiful to be tiresome. A pastoral valley is succeeded by a rugged path, through a gorge muffled in foliage and flowers. Below the gorge the torrent from the western glacier of Ushba has to be overleapt, and in the afternoon is formidable. Then follows a beautiful forest with lovely views of the Leila, until, after a steep descent, meadows open in front, and smooth grassy cart-tracks lead past the castles and farms of Mazeri, to the collection of ruinous sheds and mean dwellings which constitutes the seat of Russian administration in Suanetia.

On August 16 the same party (without the porter) went up to the head of the valley that opens into the heart of the Leila chain nearly opposite Latal. There is an excellent horse-path all the way, and the woodland scenery is enchanting. After the stream has been crossed, the forest opens out into glades, where the varied foliage and the beautiful undergrowth produce naturally the effects imitated by landscape gardeners on a small scale round our country 'seats.' Higher up the valley bends westwards, and the glaciers lying under the highest peaks of the Leila come into sight. The largest terminates on a cliff, down the face of which constant avalanches fall. Close to the head of the glen a bed of yellow lilies, blooming ten to fourteen on a single stalk, was found; and, a little higher, a pool of clear water fringed by maples—a charming spot for a bivouac, about 4 hours above Latal.

The sunset on the twin peaks of Ushba was magnificent. A thunderstorm broke, however, soon after dark, and the weather next day put a stop to further exploration; perhaps fortunately, as it appeared from above that the glaciers on this flank of the Leila are very formidable, and that any ascent would have had to be made by a circuitous and tiresome route.

Ascent of N.W. Peak of Leila (13,300 feet (?)). *August* 20.—The same party, with Prince Atar Dadish Kilian and four native hunters, started on the 19th from Ezeri for the Leila. On that night they slept at a hut 2 hours above the junction of the Betsho torrent with the Ingur. A very steep ascent leads from the hut to a pass into the wooded valley which receives the W. glacier of the Leila. This is a large ice-stream flowing from a broad saddle between the highest

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crest of the Leila and a row of icy peaks. A descent of 1,000 feet leads to the moraine. A pass over the glacier to Lentechi is occasionally used by hunters, but is reckoned dangerous on account of crevasses. The Suanetians insisted that 'there was no way' anywhere but up this main glacier, and the Prince unfortunately believed them.

The rest of the party went straight up a small and easy glacier on their left to the ridge overlooking Suanetia, and walked along it across a snow plateau, and up a bank of loose slates, to the top of the sharp peak seen from Ezeri. The Leila has two other tops—snow-domes. The central summit seemed a few feet the higher. It is also easily accessible. The mountains were all clear and the panorama superb, extending from the Adai Choch group to beyond the Nachar Pass. Suanetia, with its towered hamlets, lay, a field of green and gold—forest, meadow and cornfield—beneath the peaks and glaciers of the great chain. The Prince and his hunters halted far below on a patch of moraine some distance short of the pass. Ascent from hut about 6 hours. Ezeri was regained in the dark the same evening. The excursion offers no difficulty whatever. A shorter route may be found.

August 21.—Mr. D. Freshfield strolled up from Ezeri to the horse-pass leading to Mazeri, and thence by a delightful path over a high pasture commanding views of Lower Suanetia, and just opposite Ushba. This walk might also be taken from Betsho, passing a small tarn and a hut on a lower spur. The views are most extensive and beautiful. From Ezeri 3 hours suffices for the round.

August 22–29.—The travellers before mentioned, with two hunters supplied by Prince A. Dadish Kilian, crossed the great forest between the Ingur and Kodor. This route—known in Suanetia as that 'by way of Neskra and Darl' (Darl=the middle Kodor)—has fallen into disuse since the depopulation of Abkhasia. Between the Nakra valley and the junction of the Klutch * and the Kodor the track, where there is one, alternately plunges into the densest forest and climbs over wide pastures. There is one log hut in the Neskra valley, the only habitation between Suanetia and Shkaltra on the Kodor, a distance of four days' journey. The two passes, Nakra-Neskra and Neskra-Kodor, are about 9,700 feet above the sea. The Neskra torrent is crossed at about 3,000 feet. The views from the heights over

* See Grove's *Frosty Caucasus*, pp. 340–1.

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Suanetia, of the Kodor valley and its peaks, the main chain, and two isolated glacier groups to the S., guarding the gorge of the Ingur, are singular and beautiful. The hunter-guides lost their way, and finally, at Shkaltra, dismissed themselves, riding off suddenly home, without food or pay, on the Prince's mules, and leaving the travellers to procure transport from Lata, 20 miles off. Lata is a long day's ride (36 miles) from Sukhum Kaleh. Although the weather was cloudless, none of the party suffered from the heat, which was certainly not so oppressive as it is often south of the Alps; nor did a stay of two nights at Lata, where Mr. Grove's party believed they caught fever, have any ill results.

It may be worth mention that the journey out, *viâ* St. Petersburg and Moscow to Vladikavkaz, took 9 days (including a day at each and 4 hours at Rostoff). The return journey from Batum to London, *viâ* Constantinople, took also 9 days, but out of these 3 days were spent at Constantinople, 4 hours at Budapesth, and a day and night at Dresden. A lift can now generally be got in a petroleum boat sailing direct from Batum to Constantinople, which reduces the Black Sea voyage from 5 days to 60 hours. The actual cost of the *journey* to the Caucasus and back, first class, by these routes, is from 50*l.* to 60*l.* D. W. F.

Kazbek from the Devdorak Glacier.—At 7.30 A.M. on July 12, Mr. H. Woolley left Vladikavkaz with his guides, Christian Jossi and Johann Kaufmann of Grindelwald, for the Devdorak Glen; the party being also joined by Andreas Fischer and Kaspar Maurer, who were awaiting Mr. Dent's arrival.

On arriving at the house near the extremity of the Devdorak Glacier the clouds were so low as to conceal all landmarks, so a young Chetchen chamois hunter, Yanni Besurtanoff (son of the man met in the Devdorak Glen by Mr. Freshfield's party in 1868), was taken to show the way to the ridge, and the party, leaving the house at 4.45 P.M., ascended the path on the right bank of the glacier till well above the snout, crossed to the left bank, climbed the ridge separating the Devdorak from the Tsech Glen, and halted at 7.15 P.M. at an indifferent sleeping-place on the ridge at a height of about 6,700 feet.

There was a little rain in the night; but the following morning (13th) the weather cleared, and at 1.55 A.M. a start was made—Yanni accompanying for an hour or two—and

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after following the ridge for about 4 hrs., climbing over or round the numerous teeth, at 5.45 a large tower of rock, conspicuous from the Devdorak House, and well seen in Engel's photograph of the glacier, was gained.

From this point (about 12,500 feet above sea level) no deviation was made from the route taken in the descent of the party who first climbed the mountain in 1868.

The snow was in good condition till within about 2,000 feet of the summit, which was reached at 1.30 P.M.—too late to obtain a view, as the clouds had already arisen.

The sleeping-place was regained at 8 in the evening, and Vladikavkaz at 6.30 P.M. on the 14th.

In consequence of the convenience of the Devdorak House, to which provisions, &c., can be conveyed on a good bridle-path, the route described above will probably be that usually taken in future ascents, although it is rather longer than that from the Tsech glen.

The Eastern Peak of Mishirgi-tau.—On August 4 Mr. Woolley, with Christian Jossi and a Balkar chamois hunter named Kutché Djanibergoff (Kaufmann not being well enough to go), left Karaoul at 5 A.M. for the purpose of taking photographs from the Shkara Pass, and proceeding up the Dych-su gorge, reached the end of the glacier (about 6,800 feet) in 2 hrs.

Passing over the terminal moraine and crossing to the left bank of the glacier, which is for a great distance above its snout completely concealed by rocky débris, the party walked up the left lateral moraine, and at 11 A.M. came to an excellent sleeping-place or kosh, under an overhanging rock (about 8,500 feet above sea level), which is much frequented by the Karaoul hunters.

Here it was found that part of the photographic apparatus had been left behind, and Kutché was sent back to Karaoul for it. At 1 P.M. the others continued up the left bank of the glacier, crossed the wilderness of rock débris which covers the junction of the Khrumkoll Glacier (flowing from the north) with the Dych-su Glacier, and at 2.30 P.M. arrived at a depression in the ridge north of the latter ice-stream, in which a succession of snow-slopes seemed to give easy access to the rocks of Mishirgi-tau lying to the N.W.

It was at once decided to attempt the ascent of that peak, and at 6 P.M., at a height of about 12,000 feet, a bivouac was made on rocks in the névé overlooking the upper reach of the Khrumkoll Glacier, which, fed by the snows of Mishirgi-tau and the adjacent ridges, here runs east and west, roughly

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parallel to the Dych-su Glacier, until joined by a tributary from the southern and western arêtes of Dych-tau, when it turns abruptly to the south and joins the main ice-stream.

The following morning the sleeping-place was left at 5.30, and the gently sloping Khrumkoll Glacier ascended for 2½ hrs. as far as the foot of the great snow-couloir, which descends the southern face of Mishirgi-tau from the gap between the two peaks visible.

The latter, being considered to be the higher, was chosen for attack, and the couloir was ascended for several hundred feet, when falling stones and ice necessitated a retreat to the rocks on the eastern margin of the couloir, and the ascent was continued by these rocks till the gap was reached at 1 P.M.

The snowy ridge of the mountain was now followed in an easterly direction, and at 2.30 the eastern summit (a narrow snow-ridge) was gained, and it was then discovered that the huge tooth of rock of the W. peak was about 50 feet higher. M. Djukoff gives 16,135 feet as the height of the crest above the Mishirgi Glacier, at a point corresponding with this mountain.

There not being sufficient time to undertake the ascent of the true summit, the descent was commenced at 3 P.M.; but darkness coming on before the sleeping-place could be found, a night of discomfort was spent on rocks overlooking the Khrumkoll Glacier, which was descended on the following morning to its junction with the Dych-su ice-stream, Karaoul being regained in the afternoon.

Mishirgi-tau is the name by which reference to this mountain has been hitherto made in the 'Alpine Journal,' but no name for it seems to be known at Karaoul.* The names 'Khrumkoll' and 'Ail-a-ma,' tributaries of the Dych-su Glacier, are derived from M. Bogdanoff, of the Survey.

Dych-tau (*M. Djukoff's Koshtan-tau*).—The same party, with the addition of Kaufmann, left Karaoul at 5.30 A.M. on August 8, and, following the route taken by the search party eleven days before, arrived at 7.30 P.M. at the foot of the couloir descending from the col made last year by

* This, at least, is the mountain I named Mishirgi-tau, when I saw it from the Mishirgi Glacier in 1887. But Mr. Holder's Mishirgi-tau, which lies (as he carefully states) W. of the ridge connecting the watershed and the range of Dych-tau and Koshtan-tau, must be another summit—probably the third peak of the same crest, the middle 'rock-tooth' marking the junction of the ridges. D. W. F.

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Donkin and Fox, and bivouacked in the rocks there at a height of about 12,000 feet.

Starting next morning (9th) at 3.50 A.M., they went up the Tutuin Glacier to its head, and ascended a snow slope running up into the angle formed by the southern and eastern arêtes of Dych-tau, apparently in the direction of the summit.

After climbing up a long rib of rocks and cutting steps for an hour and a half in an ice-slope, snow in good condition followed, and at 9.45 A.M. the party gained a point, nearly 15,000 feet in height, on the southern arête, looked down on to the Khrumkoll Glacier on the other side, and enjoyed a magnificent view to the S. and W. of all the peaks from Koruldu to the Bezingi Koshtan-tau.

At the end of forty-five minutes' scrambling up blocks of granite which surmount the ridge, Kaufmann, still suffering from weakness, was obliged to remain behind. Mr. Woolley and Jossi followed the arête to its junction with the eastern ridge, marked by a great tower of rock, by climbing to the left round the base of which they reached, at 1.15, a narrow neck, which connects the tower with the final peak lying to the west, whence they looked down on to the Ullu-auz Glacier.

Turning westward from the neck, slopes of ice, covered by a thin layer of snow in bad condition, led to the summit—a snow-ridge, nearly level for twenty yards and a yard or so broad, running E. and W. It was gained at 3.47 P.M., by which time most of the neighbouring peaks were clouded.

No trace of a cairn could be found. At 4.30, after building a small stone-man on the highest rocks to the E. of the summit, the descent was begun. The ice-slope was descended by moonlight, the sleeping-place regained at 10.20 P.M., and Karaoul at 4 P.M. on the following day.

In the new map now under preparation, this mountain will be called Koshtan-tau, by which name it is known at Balkar and also at Vladikavkaz, whence it is distinctly visible.

Ascent of Koruldu, &c.—On August 14 temporary quarters were taken up at the Dych-su kosh, Kaufmann being left with the tent at Karaoul, and on the afternoon of the same day a start was made with the native hunter for the peak opposite the kosh on the south side of the Dych-su Glacier, for which there is no name amongst the Karaoul hunters, but which is named Koruldu in the sketch-map,* and in the map in 'Geographical Pro-

* *Alpine Journal*, vol. xiv. p. 24.

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ceedings,' vol. xi. Last summer Mr. Holder's party were under the impression that this peak was named Nuamquam.*

The party passed the night at an elevation of about 11,000 feet on the ridge overlooking the Dych-su Glacier, believing that this ridge was connected with the névé from which the final peak rises. The following morning the hunter was sent back, and after over 4 hrs. of hard climbing along the ridge the others found themselves separated from their peak by a deep valley containing the upper reach of the Ail-a-ma Glacier, gave up the ascent, and returned to the kosh.

Kaufmann having joined the party, an attempt was made on August 17 to find a way from the E. on to the arête leading to the summit of Shkara (called Dych-tau at Karaoul); but, at a height of about 11,000 feet, at the foot of the formidable ice-fall which flows into the Dych-su Glacier from the S.W., near the bottom of the slope leading up to the Shkara Pass (local name—Bezingi-vsek), a series of thunder storms with heavy rain began, and the ascent was relinquished.

The following day Kaufmann, owing to continued weakness, returned to Karaoul, and Mr. Woolley and Jossi ascended a summit of about 12,000 feet, lying nearly due north of Koruldu, between the Khrumkoll and Dych-su Glaciers, commanding splendid views in all directions, and from which Koruldu, Shkara, Mishirgi-tau, and Dych-tau can be photographed from one spot without moving the camera-stand.

The hunter Kutché having taken Kaufmann's place, the party left the kosh at 6.50 A.M. on August 19, descended the ice-stream for an hour, as far as the ice-fall of the Ail-a-ma Glacier (a tributary from the S., fed by the snows of the main chain), made their way along the left bank of the latter until above the ice-fall, and then followed the comparatively unbroken western branch of the glacier until high enough to gain access to the most western rocks on the N. face of Koruldu. Here a sleeping-place was found at the early hour of 3.15 P.M., at a height of a little over 12,000 feet.

In the evening snow fell for two hours; but a very cold

* This peak is very conspicuous from the south, where Dr. Radde got the name 'Koruldu' for it. Nuamquam is a prominence in the ridge E. of Shkara little noticeable from the N., but important topographically as marking the junction of the ridge dividing the Ingur and Skenes Skali with the main chain. D. W. F.

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night was followed by a beautiful day, and at 4.45 A.M. on the 20th—Kutché being left behind—a start was made up the firm and easy granite rocks. After an hour these gave place to a ridge of ice leading up to the steep snowslopes of the N. face, in which several schrunds had to be passed.

At 10.7 A.M. the summit, which is quite free from rocks, was reached and a fine view in all directions obtained. Judging from aneroid readings, the height of the peak is not more than 14,900 or 15,000 feet. An hour and three-quarters was spent on the summit, and the kosh regained at 6.30 P.M.

Elbruz from the N.E.—On August 28 the whole party left Urusbieh at 7 A.M. with a native and a horse carrying the sleeping-bags and provisions, proceeded by a good path up the Kirtik Glen as far as the highest kosh and then followed the stream till 3.15 P.M., when, on the native refusing to take his horse farther, the baggage was carried to the nearest suitable rocks and a halt made for the night.

At 6.15 A.M. on the following morning the party quitted the sleeping place, and turning up a ravine running in a north-westerly direction, walked up the left moraine of a small glacier which blocks the head of the ravine, and from it, by means of a short snowslope, reached at 7.30 a depression in the ridge about 12,000 feet high, and very little above the almost level glacier, which extends round the base of Elbruz on the N.

This glacier was crossed in the direction of the lava rocks extending for some distance up the E. face of the mountain, the lowest patch being reached at 12.30. Keeping to the right of these rocks, the ascent was continued to a chain of rocks running up the N. side of Elbruz towards the saddle, but such a violent and intensely cold wind was encountered that the party were forced to halt at 5.45 P.M. at the lowest rocks, where a sheltered sleeping-place was found at a height of between 15,500 and 16,000 feet. The night was intensely cold; but at 1 A.M. the wind fortunately abated, and at 5 A.M. on the 30th the rocks were left, the saddle gained at 7 o'clock and the western summit at 8.45 A.M.

The snow was for the most part in fair condition, and good distant views in all directions, except due W., were obtained.

After leaving a card in the cairn built a few days before by the Signori Sella, the party left the summit at 9.20, bivouacked for the night in the Kirtik Glen, and arrived at Urusbieh at 7 o'clock on the following morning.

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Attempts to ascend Ushba.—At 4 A.M. on September 8 Mr. Woolley and Jossi left a sleeping-place in the rocks at the foot of Gulba, with the intention of ascending the S.W. peak of Ushba.

Mr. Cockin's route was followed, and the snow found to be in good condition, but very hard, and requiring continual step-cutting. At 9 A.M. a point had been attained within about half an hour of the rocks of the N. peak, when the sun began to melt the ice in the cliffs above, and a continuous cannonade of stones of such a serious nature began that further advance by the couloir was out of the question, and retreat equally dangerous.

After breakfasting under the shelter of a patch of rocks, the ice-slopes were traversed in an easterly direction, until the line of fire was passed, and then steps were cut up to the base of the cliffs of the N. peak, which were gained at 1.15 P.M. Facing W. again, the party climbed along the base of the rocks (all stones going over their heads), till about 3 P.M. the source of danger was passed, and the ascent of the couloir above the ice-fall commenced. At first snow only was found, but higher the couloir was lined with ice, and progress became so slow that the saddle or neck connecting the two peaks was not gained till 6.30 P.M., and here such a strong, cold wind was raging that it was decided not to persevere in the ascent. The descent was effected by moonlight (still avoiding the lower part of the couloir), and the sleeping-place reached at 2.30 A.M. on the 9th.

On September 12 a second attempt was made, Kaufmann joining the party. The base of the cliffs of the N. peak was attained at 5 A.M.; but here the weather suddenly became unfavourable, and an obstinate case of frost-bite caused the ascent to be abandoned.

On September 14 Mr. Woolley and his guides left Betsho for Kutais and Batum. H. W.

The Signori V. and E. Sella, with Maquignaz, of Breil, and three Italian porters, left Vladikavkaz for the mountains at the same time as the search-party. They proceeded first to the Bezingi Glacier. The Saluinan Chiran range and the ridge dividing the Dych-su and Bezingi Glaciers were visited, and numerous photographs taken. Maquignaz then fell ill with dysenteric symptoms, and was sent home.

The Signori Sella, with their porters, went up the Donmala glen, whence they made the first ascent of the Ullu-

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auz-bashi of M. Djukoff (Mala-tau of Mr. Freshfield), 15,351 feet. They subsequently ascended the W. peak of Elbruz, crossed to Suanetia, photographed round Betsho, and climbed the central peak of the Leila. Their journey has been very successful from a photographic point of view, and its results (as well as Mr. Woolley's) will be looked for with much interest.

Two ascents of Kazbek, besides Mr. Woolley's, have been recorded this year. The first, made on June 20 by Herren Eugen Ruckdeschel and Georg Hirsch with the guide Franz Hofer of Kals, was effected by M. Lerco's route direct from the post-station, up and down in one day of $16\frac{1}{4}$ hrs.*

Another ascent, subsequent to Mr. Woolley's, made by Russians, has been recorded in the Tiflis newspapers. Further particulars will doubtless come to hand.

Topographical Results.

Any complete account of the topographical results arrived at in this year's explorations by English mountaineers must be deferred to future numbers. A very brief summary only can be here given.

The Adai Choch group still requires a detailed exploration before any map of it having the smallest pretensions to even general accuracy can be constructed. The two high peaks seen by Mr. Freshfield in 1887, from heights above the Rion basin, appear to stand at the head of the eastern névé of the Karagam Glacier. The northern and loftier of these two peaks (No. 1) is on the same ridge and somewhat east of the rock-peaks above the ice-fall of the Karagam, and probably overlooks on the other side the Skatygom Glacier. This is the highest peak in the group. The second summit, first seen by Mr. Freshfield in 1887, rises between the heads of the Ceja and Karagam Glaciers, and behind and close to the 'double peak' of Mr. Freshfield's 'Central Caucasus.' This summit (2) is visible from the village of Ceja, and is probably that to which the name of Adai Choch and the height of 15,244 feet were assigned by the authors of the 5-verst map. A pass may be made between peaks 1 and 2 from the Karagam Glacier, probably to the Skatygom: another pass between 2 and Mr. Freshfield's double peak from the Karagam to the north-western head of the Ceja Glacier. It follows that the sketch-map published with M. de Déchy's paper in the twelfth volume of this journal, as well as a much more pretentious map issued, with a recast of the same paper by M. de Déchy, in 'Petermann's Mitteilungen' for September last, are to a great extent inaccurate. The portions of these maps of real value are the basin of the Ceja Glacier (which M. de Déchy himself visited), and the

* *Mittheilungen des Deutschen und Oesterreichischen Alpenvereins*, 1889, No. 13, p. 160.

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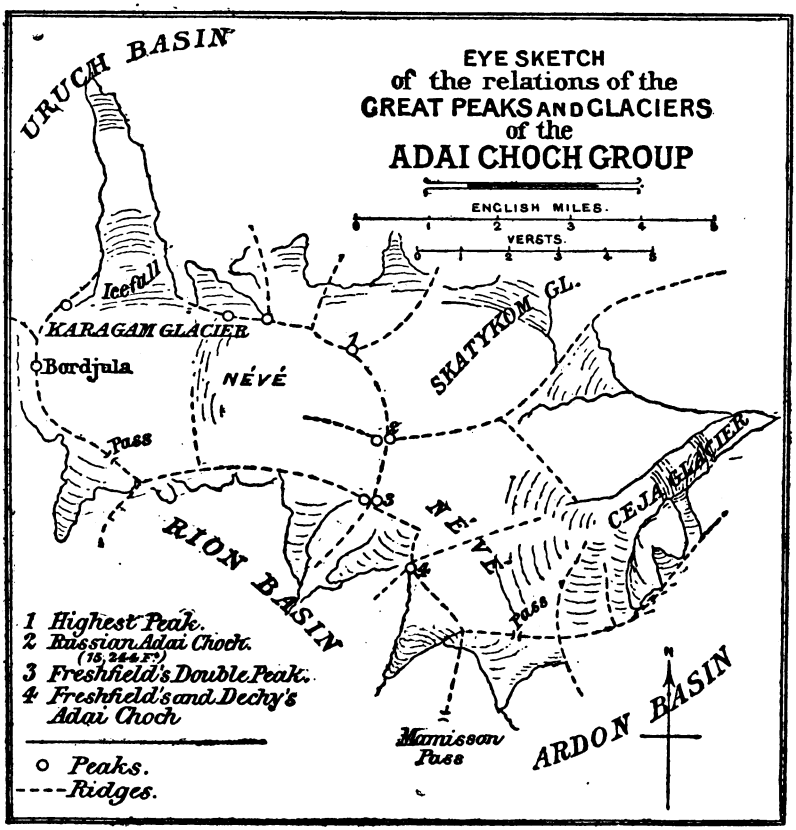
glens of the Dargom and Skatygom, in which the *new* Russian survey has been used. The internal features of the Ceja névé are fairly indicated, but the geographical position given to its bounding ridges is not, I believe, accurate. The representation of the rest of the group (including the glens and horsepath between Kamunta and Zenaga) is copied from the 5-verst map, which is fictitious in this district. Through following its indications Petermann's mapmaker has in this instance (as I have myself in others) been entirely misled. The accom-



panying rough diagram may make more intelligible this intricate piece of orography.

In the central group the upper basin of the Tutuin Glacier has been discovered, and Mr. H. Woolley has cleared up the relations of the ridges and glaciers between it and the Dych-su Glacier.

In the sketch-map published in June last in the 'Geographical Proceedings,' the eastern branches of the Chegem valley are (as I warned readers at the time was probable) erroneously represented. The

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Bulungu Glacier is in reality small and unconnected with the watershed. A vast glacier, flowing parallel to the main chain, stretches from the western base of the Saluinan Chiran peak to the Gara-su, or eastern head of the Chegem valley, and is called the Shaour-tu.

In the same map the Chegem spur is incorrectly laid down. The existence of three passes over it, and the relations of its main glaciers, have now been ascertained. The limestone peaks of the Jilki-su form a separate *massif*.

The existence of two practicable passes E. and W. of Ushba to Suanetia from the Shichildi Glacier has been established.

The northern and western valleys of the Leila chain have been visited for the first time by travellers, and a lofty glacier pass through the heart of the group used by the natives, and leading directly from Ezeri to Lentechi, made known.

Finally, the problem of finding a practicable mountain route for travellers with luggage horses through the uninhabited and almost pathless forests to the west of Suanetia has been solved. It is believed that no traveller has passed through these forests since Mr. Spencer, fifty years ago, if, indeed, his very confused and disjointed narrative refers to the route traversed by Captain Powell and Mr. Freshfield.*

The information thus collected should be of some service to future travellers. But the most satisfactory and important fact connected with the exploration of the Caucasus remains to be mentioned. General Shdanoff, the Head of the Survey Department, has taken up in earnest the task of re-mapping the chain with the utmost attainable accuracy, and with all reasonable speed. This summer Survey Officers were found in Suanetia and in every valley on the N. side. Their sketch-maps and memoranda were placed without reserve and with the greatest courtesy at the disposal of English mountaineers. It is by them, concurrently with the climbers of this year, that most of the above-mentioned rectifications have been established; and it will be to them that the first authentic picture of the great glaciers will be mainly due. With some little help from mountaineers with regard to inner portions of the chain invisible from any spot accessible to natives, the new Survey promises to be among the most accurate yet constructed of any snowy range, and if it is reproduced in the style of the portions privately issued last year (Elbruz and the Mishirgi Glacier), it will vie with the productions of any country in Western Europe. When the whole of the sheets depicting the Central Caucasus have been published, men of science and mountaineers will alike be astonished at the extent and complexity of a glacier system which has no rival in the Alps, and new material of great value will be furnished for all those who make a study of mountain phenomena. D. W. F.

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* See Spencer's *Travels in the Western Caucasus*, vol. i. p. 319, London, 1838.

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The Oetzthal District.

By A. J. BUTLER.

(Read before the Alpine Club, April 2, 1889.)

WHEN I first received the Secretary's injunctions to read a paper on the Oetzthal district I was much disposed to cry off. It seemed probable that the Club, fresh from feasting on the wonders revealed by Caucasian explorers, would hardly be tempted by ordinary alpine fare; unless, indeed, it could be dressed with some unwontedly piquant sauce in the way of adventure; and that I was quite unable, consistent with the most elementary principles of veracity, to provide. However, my sense of discipline prevailed, and I undertook to do what I could. Fortunately, too, for me the paper read a month ago brought us back to something more like our accustomed diet. The transition, therefore, will not be so violent, and I shall not need to feel that from a hypsometrical point of view at any rate my paper is of the nature of a 'come-down.' Indeed, so far as that is concerned, it is something of a 'go-up'; for my district can show peaks overtopping by some 1,300 feet, according to the latest measurements, the highest point of that Dolomite group of which Dr. Scriven gave us such an interesting sketch. Further, though, no doubt, that region has peculiar beauties, and possesses a peculiar attraction for mountaineers in its blending of gymnastic and picturesque advantages, and should be visited by everyone who wants to see what can be done—'Quum voluit Natura jocari'—when Nature is going in for freaks, I for one should maintain that for scenery which is permanently satisfying, and to which one can return year after year with ever-increasing enjoyment, and also for variety in the forms of climbing which they offer, there is nothing like the crystallines, the gneiss and mica schist, of which your old-fashioned, steady-going peaks like Monte Rosa, and, indeed, most of those in the central chain of the Alps, are composed.

It is about a very marked division of the central chain that I have to talk this evening. Everyone who has paid any attention to the map of the Alps knows that from the point somewhere not very far from Nice where they begin to bear glaciers, to the other point not very far from Klagenfurt, where glaciers come to an end, there are only two important passes in which the main chain sinks to a height of less than 6,000 feet. These two passes, the Brenner and the

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Reschenscheide, both under 4,600 feet in height, correspond to the two principal headwaters of the Etsch, and are, as the crow flies, very little more than 50 miles apart. Between them, and bounded to N. and S. by the valleys of the Inn and Etsch respectively, lies the largest glacier-covered area which is to be found east of the Simplon Pass. It is, no doubt, exceeded in height by several other groups of the eastern half of the Alps: the Bernina, the Ortler, and the Glockner groups can all show one or more summits which beat the giants of the Oetzthal, the Wildspitze and the Weisskugel, by several hundreds of feet. It has, indeed, been made a subject of complaint against this district that the glaciers are too big for the peaks. But the general elevation is quite equal to that of any of the groups mentioned. Mr. Ball* informs us that, if the whole mass were rolled out flat, 'it would form a plateau 8,332 feet above the sea-level.' Some notion of the general configuration of the group may be obtained if we suppose the Oetzthal to represent the valley that goes up from Visp. The Nicolaithal will then be reproduced by the Fenderthal, and the Saasthal by the Gurglerthal. The Pitzthal and Kaunserthal will correspond to the Val d'Anniviers and Val d'Hérens. We must suppose the head of the Val Anzasca carried far to the west in order to make it occupy the same position to the chief peaks of the Breithorn-Monte Rosa range, as the Schnalserthal does to the Weisskugel-Similaun chain; but the Brenner will very fairly match the Simplon, and the Stubai Alps, separated as they are from the main block by the only unglaciered pass which can be found over the watershed from the Reschenscheide to the Brenner, reproduce with considerable accuracy the Fletschhorn group in its position with regard to the main areas of Monte Rosa. I have gone at this length into topography because I believe the district in question is almost entirely unknown to the Club. Mr. Tuckett once swept like a meteor through the Alps of Central Tyrol, alighting on a peak here and there, and took the Oetzthal in his triumphant course. Mr. Starr wrote a paper in the Journal some eleven or twelve years ago; and a few scattered notices have from time to time appeared in the accounts of new expeditions; but it is only necessary to study the visitors' books at the principal centres—Fend, Gurgl, and Unser Frau—to see how completely this interesting country is *terra incognita* to the vast majority of English mountaineers. I

* *Alpine Guide*, 'Eastern Alps,' § 48, p. 142 (first edition).

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may add that, wishing to supplement the rather antiquated lot of photographs which I possess by something more up to modern requirements, I went to Mr. Spooner's in the Strand, and found that among a large stock of Tyrolese views there was not one from the Oetzthal group.

My first acquaintance with the district was made in 1874. I approached it by the route which will always remain the most convenient for those who wish to come to terms as soon as possible with the highest peaks of the group—namely, by the Stubaithal from Innsbruck. About 12 hours' walking from the capital will bring you to the Dresdner Hütte, at the head of the valley I have named; and from the hut, without an inordinately early start, you can cross the Bildstöckl Joch, and reach Sölden in the forenoon; from which place to Fend or Gurgl—the Zermatt and Saas of the district—it is a comfortable afternoon's walk. Sölden is the last place in the valley where beer can be got. It also has an interest of a more melancholy kind for English travellers, for in the churchyard of it lies the victim of one of the earliest of those accidents which our Club seldom meets after the holidays without having to deplore afresh. Mr. Watson was crossing the Bildstöckl Joch in 1860 with a guide who, like most Tyrolese guides at that time, and not a few now, thought that his business was merely to show the way. There was, I believe, no rope; anyhow, it was not used. The glacier is small, but steep, and the crevasses not very numerous, but of some depth. Mr. Watson fell into one, and in due course his body was brought up from a depth of 90 feet. He now lies, as I have said, in the parish churchyard of Sölden; and it is a remarkable instance of the freedom from prejudice which characterises the Tyrolese clergy that his tombstone is allowed to bear the title 'Ecclesiæ Anglicanæ Sacerdos.' This accident gave the Bildstöckl Joch a bad reputation, from which it had hardly recovered when I was first there. At all events, the guides refused to cross it except in pairs, on the plea that it was the first passage of the season, and I was forced to take two men for this very ordinary expedition. They are not so strict now—indeed, the next time I went that way, in 1880, my companion and I had no guide in particular, but depended on the good offices of one who was nominally attached to another party, but transferred himself and his rope to our service over the crevassed part of the route. Nowadays, a stream of tourists bound for this pass goes up the Stubaithal every fine day; and not long ago I heard of two who, being accused of some dishonesty in

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the Stubaithal, were pursued by the gendarmes and brought back by that route. Probably there is no pass of the same height (10,250 feet) (except the St. Théodule) in the Alps which is so frequently traversed.

About an hour above Sölden the Oetzthal divides into its two main branches—the Gurglerthal to the S., the Fenderthal to the S.W. Of the former I can say little. I have twice been at Gurgl, but have never been favoured by the weather. I can, however, assure any member who may visit the place that he will be made heartily welcome by the most jovial old parson, I should think, that ever owed allegiance to the see of Rome. He wears a long shaggy coat (whence probably his local name 'der Eisbär'), long boots, and a long pipe; and though he is not, I believe, like some of his brethren who have had the cure of souls at Fend, a practical mountaineer himself, he has every sympathy with mountaineers, and does his best to make them comfortable.* Gurgl Church is the highest, or nearly the highest, parish church in the Alps. It lies about 6,200 feet above the sea. Of the sister village of Fend I can speak from fuller knowledge. Though its actual position is less beautiful than that of Gurgl, scarcely any glacier or snow being visible from the village itself, it has the great advantage of lying right at the foot of the chief peak of the group. This, the Wildspitze (12,416 feet, according to the latest measurement), can be ascended from the parsonage of Fend comfortably in a little over five hours, including breakfast. Even this moderate amount of exertion is now lightened by the erection of a hut, known as the Breslauer Hütte, at a height of 9,500 feet, on the S. side of the mountain. This, however, did not exist when I started at 12.45 on July 6, 1874, with Herr Kuprian, the then *Curat*, a most indefatigable climber and chamois-hunter, and an elderly gentleman named Josef Scheiber, who in those days was the senior guide at Fend. We went by lantern-light, I remember, straight up the steep grass slopes to the W. of the village, reached the Rofenkar glacier about sunrise, breakfasted, and climbed a steep ridge of rather rotten rocks to the top. Just before we reached these rocks we were overtaken by the parson's dog, who, as we found by a subsequent comparison of times

* I regret to say that since this was written advancing years have rendered it necessary for Herr Gärber to accept a cure in a less rigorous climate. He is now at Elbigenalp in the Lechthal, and his cheery 'Gruss Gott' will no more be heard by visitors to Ober Gurgl.

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with those below, must have given us nearly three hours' start, and caught us in little more than an hour. He showed excellent climbing powers, and we all reached the top at 5.55. The view was very fine; we could just make out the Bernese Oberland. The summit of the Wildspitze is a sharp ridge of snow, about 50 yards in length, and the N. end is usually given as some five or six mètres higher than the S. German tourists, I observe, are always careful to mention that they have ascended the Nördliche Wildspitze. When I was there, however, there was certainly no perceptible difference, and it was not till long afterwards that I learnt that one end was supposed to be higher than the other. From the point we reached the view was quite unbroken all round. Probably, like most snow summits, the top of the Wildspitze varies in configuration according to the direction of the wind at the time of the last snowfall.

Of the second peak in the group, the Weisskugel, I can tell very little. By some curious and obscure nexus of cause and effect, whenever I go near that mountain it snows. This phenomenon has been noticed by J. Spechtenhauser as well as by myself. Thrice have we been defrauded in this way of a projected ascent; and on the one occasion, when we did reach the top, virtue had to be its own reward, for no view did we get save of the icicles in each other's beard. Mr. Tuckett, I believe, says that the view is the finest in the Alps, but that must be under more favourable atmospheric conditions. Even in bad weather, however, it is a nice straightforward climb; the only difficulty being caused by a wire rope, which of late years has been fixed along the *Grat*, and which keeps getting between your legs in the narrow places. It is quite unnecessary, and, perhaps, when some one has broken his neck by reason of it, it will be removed.

The Weisskugel is, as Mr. Ball points out in the preface to his section on this group, the true central point from which its main ridges radiate. The watershed between the Inn and the Etsch—that is, between the Black Sea and the Adriatic—runs for a while due E., and so at right angles to the general direction of the Oetzthal, which it closes to the S., while on its southern side it forms the N. boundary of the upper Schnalser Thal. Consequently, while all its great glaciers stream down to the N. it falls away to the S. in precipices and steep slopes for some 6,000 feet. This I had a good opportunity of verifying on one occasion. I had reached the top of the Similaun with old Josef Scheiber. The usual way to ascend this peak is by easy and very

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moderately steep snowslopes from the Niederjoch. Scheiber, however, had taken me by what he was pleased to call a short cut—namely, along the ridge known as the Marzoll Hügel, stretching N.W. from the peak. It was not difficult, but rather nasty going, being composed of rotten rocks covered with loose snow, and, I believe, had taken just as long as the regular way; so I had been rather looking forward to the easy descent. But when it was time to start downwards my guide turned to me with the abrupt question, 'Sind Sie schwindlich?' I said I did not know, but I was willing to try. So he suggested that, instead of going round by the Niederjoch, we should descend straight upon Unser Frau. There was the further inducement that no one was known to have passed by that way before. We started accordingly, at first down a steep rock-*Grat*, then down snowslopes too steep and too soft for a standing glissade, where it was necessary to toboggan with no appliances beyond what Nature had furnished us with, and, lastly, over *Geröll* and grass. We reached Unser Frau in about one-half of the statutory time; and the route was obviously so much the most convenient for able-bodied people that I could hardly believe it had not been previously taken. However, Josef Spechtenhauser has often assured me that such was the case; and, moreover, that to the best of his knowledge no one has ever been that way since. 'In fact,' said he to me only last summer, 'old Scheiber said afterwards that his sole reason for taking you that way was that you walked too fast for him, and he thought he would take it out of you; and he was much disgusted at finding that you were as fresh as ever next morning.' (It must be remembered that this was fifteen years ago.) Probably a little later in the season it would be a very rough route, but never impracticable.

East of the Similaun lies what is, I think, quite the finest pass in this district, known as the Similaun Joch. It is somewhat curious that this pass should have attracted so few tourists, for, though masked from the S., it is quite apparent to anyone following the much frequented road to the Niederjoch from Fend. From this side it bears a certain resemblance to the Eiger Joch, as represented in the illustration to Mr. Stephen's 'Playground of Europe.' There is the same thickly crevassed glacier, in this case the Marzoll Ferner, and at the head of it a beautiful curtain of snow, joining the Similaun with the Marzoll Spitze. Six or seven years ago Spechtenhauser told me that he felt sure a pass

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was to be made that way, but weather prevented our attempting it then. In the following year he succeeded in crossing it with a Herr Reitzenstein, though they did not complete the descent of the glacier on the N. side, but on reaching the head of it turned off to the E., and ascended the Hintere Schwärze and another smaller peak, returning to Unser Frau—a very good day's work. From that time he believes that the pass remained untraversed till he took me over it last year. Some account of it will be found in the Journal for November last (p. 161). I need only add here that I should advise anyone who may be tempted to visit those parts to take it from the N. side. The snow curtain on that side is about 600 feet high, and extremely steep. We found it in very good condition, so that we were able to come down, after a short bit of step-cutting, with our faces to the snow, sticking on with our axes, and kicking our toes in—at least Josef kicked his toes in, and I put mine into the holes; but if it was either very hard or very soft it might be awkward. Also the view to the S. is much the finer, and it must burst with wonderful effect upon anyone who has reached the pass from the N. side.

We slept that night at the Sanmoar Hütte, close to the foot of the Marzoll Ferner. This is a hut of a highly developed kind. There are four sleeping-rooms, with accommodation for at least twenty persons, besides the guides' room, a sitting-room, and a kitchen. It is a speculation of a Sölden innkeeper. Three active and friendly young women keep house, do the cooking, and make visitors as comfortable as circumstances will allow. We were a company of some half-dozen tourists, and after supper one of the party, who had found out the capabilities of the establishment, announced that two of our hostesses, if I may so call them, could sing. So they were invited in, and for an hour and a half they sang to us in admirable style and with perfect taste one after another of the regular repertory of Tyrolese songs, the guides now and then joining in. Meantime, of course, we drank a good many *Viertels* of wine, so that the exercise of their talents tended very directly to 'the good of the house.'*

* I have since slept at the Sanmoar Hütte as one of a company of twenty-five 'Herrschaften' and ten guides. On this occasion it was no doubt a little crowded; and we were not much surprised to hear subsequently from a party who had passed the following night there that they had found nothing to eat or drink. But it was worth while

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The next morning I went with Spechtenhauser up the Hintere Schwärze, the fourth, or, if we omit the Prochkogel, which is a mere buttress of the Wildspitze, the third, in height of the peaks of this group. It is a beautiful snow-peak on this side, rising from the eastern branch of the *névé* of the Marzoll Ferner. On the S. side it falls in precipices, which would probably afford a fine opportunity to those who like to try new routes, toward the Pfossen Thal, a side glen of the Schnalser Thal. On the N. side it presents no difficulty, but requires a good deal of step-cutting, the snow being about as steep as snow is made. On the occasion of the first ascent, as I was told by one who was of the party, Dr. Petersen measured the slope at 63°, and they went part of the way with one arm over the *Grat*. It was certainly not so steep at this last year, but I think that in some places it must have been very near 60°. The view from the summit is magnificent, being interrupted only by the Weisskugel, nine miles distant; and this is so conveniently placed that it cuts off nothing but the part of the Silvretta group which lies between Piz Linard and the Fluchthorn. The Dolomites, in particular, show very finely under the morning sun. The Hintere Schwärze is 11,900 feet high, and is reached from the Sanmoar Hütte in something less than three hours.

Before concluding this rather fragmentary paper, which I am afraid will have struck you as being little more than diluted guide-book, I would point out that there is still a little bit of almost unexplored country in this group. The short ridge which runs W. from the Weisskugel soon takes a sharp turn to S.W., and divides into two branches. Between these branches lies a glen called, from the village at its mouth, the Planail Thal. Its waters flow into the Etsch a little above Mals. I was in this valley last year, and, so far as local report went (confirmed, I may add, by Spechtenhauser's inquiries), no record of any visitors could be found other than 'zwei Herren,' who were said to have been there many years ago, and who were probably connected with the Government Survey. There are some fine peaks about 11,000 feet in height around the head of the valley, and I have little doubt that an interesting route to the Weisskugel

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being there to see the wonderful intelligence and good temper with which the attendant damsels supplied everybody's requirements. No one was kept waiting beyond a reasonable time, and no one got what had been ordered by some one else. They even found time to sing!

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could be made by going up the Planail Ferner, and along the above-mentioned W. ridge. The final ascent of the peak would correspond with that made by Herr Meurer from Langtaufers, of which a notice appeared in these pages in 1881.* I commend this to the notice of members in search of new expeditions.

I have been told that this paper was too short. With the view (among other things) of remedying this defect, I went again to the Oetzthal last summer. My plan was to see as much as possible of those lateral valleys which I had not already visited. On Monday, July 29, I slept at the parsonage of Niederthei, near Umhausen. I had passed that way two days before, and had consulted the parson about a guide. Regular guides there were none; but he promised to look me out a trustworthy 'Bursch.' Accordingly on the morning of the 30th I started with an active young man, who carried a rifle on his back and a weapon something like a boathook in his hand, with the intention, if weather permitted, of making an attempt on the Strahlkogel,† and, 'weather or no,' crossing the Breiter Grieskogel to Gries and Längenfeld. We went up the Grasstaller Thal (or Grasthal) till we were under the former peak, when it became clear that nothing was to be done in that direction, for snow-squalls were driving persistently about its top, and new snow lay on all its ledges. At this point a large herd of 'Gemsen' came into view, crossing the northern ridge of the mountain. Mercifully they were far out of shot, or we should hardly have reached our destination that day. As it was, I was not allowed to stir while one of the wretched animals was in sight. The comparative frequency of the chamois in Tyrol is a serious impediment to progress in a

* *Alpine Journal*, vol. x. p. 361.

† The Strahlkogel (*circa* 10,700 feet) was ascended for the first and, I believe, hitherto only time, by Herren Purtscheller and Drasch on August 28, 1887 (*Oest. Alpen-Zeitung*, No. 234, pp. 314, 316). Both the former and Herr Hess, in his new Guide to the Oetzthal, have, I think, rather overestimated the height of this peak. They give it at only 9 mètres less than the Grieskogel; but as far as I could judge from occasional glimpses when the clouds broke, there cannot be much less than 100 feet difference between the two. The Strahlkogel, though by far the more imposing peak, was very perceptibly below us. The height given in the Government map, however, is certainly too low, and belongs to another peak. It is clear that the ascent from the Grasstaller Ferner would offer no serious difficulty.

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physical sense. However, at last they disappeared, and we proceeded. A little tarn lay below us to our right; and to the left we were just abreast of a steep 'Kamin,' in which the new snow lay thickly. I drew my guide's attention to the place. He promptly remarked, 'Es sieht a bissl hübsch aus,' and went straight up it! It was not precisely nice climbing, as wherever there was not soft new snow there was a skin of ice; but he went like a squirrel, and I availed myself once or twice of the aid afforded by the boathook, hooking my axe into that implement while he pulled; and so we arrived happily on the Grasstaller Ferner, having, I imagine, saved a little time by taking what I believe to have been a purely fancy route. After this it was a mere snow trudge of more or less steepness to the summit of the Grieskogel (10,785 feet). There was no view, for the N.W. wind kept driving cold clouds across, and at times, I think, it snowed a little. My beard was frozen stiff, also; so there was every inducement to get on. At this point my guide incidentally remarked that he had never been there before. He had once started with a Herr who had got 'schwindlich' (where, I cannot imagine) before they reached the top, so they had gone back. Also he hated what he would call 'Gletschner.' 'I would rather go up three peaks,' said he, 'than cross one glacier.' That, of course, is the regular view of the unregenerate 'Gemsjäger.' But I expounded to him the virtues of Manilla hemp, and fortified by that prophylactic we started downwards in the direction of the Winnebach Thal. My guide's mountain instinct enabled him to take a very good line, and when we got below the cloud, we were just where we ought to have been. Presently the track of another 'Gems' appeared on the snow, and caused a slight return of excitement. 'I am not in my own district,' he said, 'but if I get a chance, *ich thue Schiessen* all the same.' Happily he did not get the chance, which would have involved also the chance of our having a bullet sent after us, if any local 'Jäger' happened to be in the neighbourhood; and shortly after he sat down and took the lock out of his rifle. as the etiquette is when you are in somebody else's 'Gebiet.' We reached Gries in due time, and parted. If any member of the Club thinks of investigating the wild and beautiful region which lies between the lower Oetzthal and the upper Stubaithal, and wants a cheery and active companion, he cannot do better than go to Niederthei and engage Johann Georg Leiter; but I should not recommend him just at present to a novice.

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Two days after this, in pursuance of my plan for seeing the less frequented side valleys, I left Huben about 6 A.M., accompanied by Alois Gstrein, and went up the Polles Thal to the joch of the same name (*circa* 9,900 feet), which looks down upon Mittelberg, and up the lovely Mittelberg Ferner to the Wildspitze. From this point the peak is exceedingly beautiful. The ridge which forms its top, being seen end-on, appears as a sharp point, and the general outline of the mountain is not wholly unlike that of the Monte Rosa from the Riffel—of course on a reduced scale. An easy walk of a few hundred yards over loose rocks, to the southward, brought us to the Pitzthal Jöchl (9,941 feet), whence we descended the Rettenbach glacier and valley, reaching Sölden about 3. Actual walking, I think, about 7 hours. In the following week I left Sölden, in company with Messrs. A. M. and A. E. Balfour, respectively of Trinity Hall and Trinity College, Cambridge, and went up to the Ramolhaus, a small inn which an enterprising guide and innkeeper of Obergurgl has erected at a height of 10,100 feet above the sea, just below the much-frequented Ramoljoch. The next morning we crossed the Schalfkogel (11,600 feet) to the Sanmoar Hütte, and on over the Niederjoch to Unser Frau. In fine weather, this would be a charming expedition, but we were not very fortunate. Indeed, one of the party had a very narrow escape from frost-bite.

The next morning was spent in loafing, and deciphering the legends of the curious old pictures which are preserved in the church of Unser Frau. They represent the building of the church in 1304, but are themselves of much later date, probably the 17th century. The story, as told by them, is that on the hillock where the church now stands a little image of Our Lady was found by some pilgrims. Thereupon the people set to work to build, but down below by the riverside. A series of disasters (most graphically depicted) warned them off from this site; and the church was placed on the hill, where it is to this day. The image, which has in its day worked miracles, is still shown to the faithful. In the afternoon we walked down to Carthaus, a village built within the *enceinte* of a former Carthusian monastery. Many of the houses stand over the cloister, which still preserves its general appearance, and some remains of moulding and tracery. Thence a steep descent to the valley floor, and an equally steep ascent on the other side, brought us into the Pfossen Thal, the wildest and most solitary of all the glens in this region. How rarely it is visited is proved by the fact

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that for some distance edelweiss grows abundantly by the roadside. Four or five farmhouses are sufficient to contain all its population. It was at the highest of these, and indeed the highest in Tyrol—appropriately named Eishof (6,770 feet)—that we hoped to find a night's lodging. The house lies in a green basin of hayfields, walled round by peaks over 11,000 feet in height. When we first reached it, the haymakers had just knocked off work, and were coming in for their evening meal; but as soon as this business was despatched, we were hospitably greeted. Two roomy beds and any amount of 'Heulager' were put at our disposal; the establishment provided excellent milk and butter, and tolerable wine; white bread and meat we had brought with us. So we supped and slept well. We were up long before the sun; but the preparation of coffee took so long, that it was nearly 6 before we got off. We went rapidly to the Eisjöchl (9,470 feet), and, turning to the left, climbed the rocky *Grat* which extends thence to the summit of the Hohe Wilde. This is, I believe, not the orthodox route, though Messrs. Craven and Moseley descended by it in 1876. The rocks, though fairly steep, are everywhere good, and about 1½ hour sufficed to reach the top (11,410 feet). Clouds were sweeping up from the S.E., and all view on that side was shut out; but the Ortler showed well. Our descent was along the northern *Grat* to the Langthaler Joch. The snow was not in very good order, and some caution was required; especially at one point, where it was necessary to pass from the W. to the E. side of the ridge. We reached, however, the névé of the Langthaler Ferner without serious difficulty; made our way without any material check through its big crevasses; got to Gurgl about 3.45, and refreshed copiously; and arrived at Sölden at 7 precisely.

The First Ascent of the Punta del Broglio.

By FREDERICK GARDINER.

SOME years ago a frank-spoken Yankee met me at the door of the hôtel at Visp. I had been three months among the mountains, working most of the time, and in consequence both my clothes and myself were in a rather dilapidated condition. After inspecting me for a short time he observed, 'Wal, I guess you'd have thought it mighty hard lines if you had had to do it,' which was quite a new light on mountaineering, and one in which I had not hitherto re-

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garded it. It was reserved for my twenty-fourth visit to the Alps, and the first ascent of the Punta del Broglio (11,336 feet), in the Graian Alps, during the past summer, for me to find that 'I had to do it, and that it was mighty hard lines.'

In company with Mr. Coolidge and our guides, young Christian Almer and his brother Rudolf, I started from the magnificent new hôtel at Ceresole at 4.15 A.M. on August 8 last, and mounting most comfortably by one of the King of Italy's hunting paths to the Colle della Porta, took the western Col du Grand Etret, reaching the pass at 10.15 A.M. Keeping along the ridge to the base of the Broglio, we passed by the eastern Col du Grand Etret, where we found in perfect preservation Mr. Freshfield's card left there in 1867. The ascent of the Punta del Broglio, until the final 60 feet were reached, was in no way remarkable as to difficulty, the only incident of note being that we saw a superb male bouquetin, who scarcely took the trouble to hasten his speed, although he must have seen us. But those last 60 feet were something to remember! Anything more fiendish I have scarcely ever seen or climbed. When we reached the point which from below we had mistaken for the top of the Broglio, we were confronted by four overhanging pinnacles like the fingers rising from the palm of a giant hand. Under the first and most southerly of these we had to pass, to gain the narrow gap between the first and second fingers of rock, and then to determine which of them was the higher. The two fingers to the north were palpably lower than the two to the south, but it was difficult to determine from below which of the two latter was the higher. Trusting to Christian's judgment and instinct, we decided (fortunately) to attack the most southerly. We examined and peered round it on every side—no chance anywhere except to attempt it from where we were, between the two southerly fingers. 'Oh, Christian, it won't go there!' I exclaimed; 'it is almost perpendicular.' 'It must go,' he replied; 'it is *teufelisch*, but it must go.' My remark thereon was, 'It might go, but that I wouldn't.' 'Oh, yes, you must,' said Christian. 'Oh, no, I mustn't,' said I. In the meantime Christian had reached a spot where his legs were stretched out to the utmost possible extent—a spot which he had reached (apparently without either foothold or handhold) by rubbing his shoulders on one peak and his feet on the other, and there he was immediately above my head spanning the gap like a Colossus in miniature. 'Good gracious, Christian! I can't get up there; and, if I did, I should split in two!' 'Oh, no, you wouldn't,' he answered; 'and your

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legs are longer than mine. Come along, come along.' 'No, I won't!' 'Yes, you must!' and so on, with many a suggestive tug of the rope. Well, I got up searching for foothold and handhold, wearing out both my finger-tips and the toes of my boots in the effort. I was constantly adjured by Christian to trust to the rope, but that I never like, much preferring the use of my hands and feet whenever possible. Coolidge was almost exhausted with laughter, and declares that all the while I was insisting upon the impossibility of the ascent I was really climbing upwards. When we reached the top (which consisted of a hollow in which we could all sit comfortably) we were delighted to find that we had chosen wisely, and that our pinnacle was at least 10 or 12 feet higher than the neighbouring finger of rock, and that there were no traces whatever of any previous ascent. We seemed suspended in mid-air, the peak overhung so terribly, and was so very precipitous on every side; fortunately the rock was perfectly firm. On the nearest and much easier pinnacle we saw a small cairn built by Signor Felice Montaldo in 1877, but, unfortunately for him, his peak is not the highest point of the Punta del Broglio.

The difficulties of the descent were like those of the ascent, 'only more so'; but I held no argument with Christian, as whatever doubt there had been as to the necessity of going up, the fact that we had to get down was scarcely open to dispute. Rudolf came down first, then I followed, receiving a mild expostulation from him at one point, when in my search for good foothold my hobnailed boot was resting on the crown of his head. At last I reached the bottom of the gap, untied the rope, and, skirting round out of the way of the others, sat down under the shadow of our overhanging pinnacle, and spent the time I had to wait while Coolidge battled with the difficulties of the descent in examining the numerous wounds my fingers and clothing had received in my tussle with the final peak of the Punta del Broglio.

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IN MEMORIAM.

JOHN BALL.

MR. BALL'S death in London, on October 21, at the age of 71, is an irreparable loss to many persons and many causes, and not least to the members of the Alpine Club. While a full account of his life and labours must be reserved for the February issue of the 'Alpine Journal,' it is impossible to send forth this number without a few words to the honour and praise of a man whose work in the Alps may perhaps be most fitly characterised as that of the chief pioneer of mountain exploration, whether in its scientific, its practical, or its literary aspects.

It must be left to persons better qualified than myself to speak of Mr. Ball's services to Alpine botany, Alpine geology, and the accurate knowledge of glaciers, whether rendered in the Alps proper, in the Andes, or in the Atlas. In these pages one is bound to think of Mr. Ball as 'the true Alpine Guide in the body as well as in the spirit.'* As a mountaineer his most noteworthy feats were probably the famous passage of the Schwarzthor (August 18, 1845), when he guided his incapable guide through the séracs of the Schwarz Glacier; the ascent of the Pelmo in the Cortina Dolomites (September 19, 1857), when he pushed on alone to the highest summit, leaving his trembling guide behind him; and the ascent of the Cima Tosa, the highest pinnacle of the Brenta Dolomites (August 9, 1865), this last expedition being accomplished in the company of his life-long friend, Mr. W. E. Forster. But though these three climbs were the most considerable he made, we must not forget that, as he told the world in the preface to the first volume of his great work on the Alps, he had (by 1863) 'crossed the main chain forty-eight times by thirty-two different passes, besides traversing nearly one hundred of the lateral passes.' In this respect few of his followers have surpassed him, while I venture to state with the utmost confidence that no one man has ever possessed a wider or a more thorough knowledge of the entire chain of the Alps than Mr. Ball. And this knowledge, gained in the course of many years of travel and exploration among the mountains, was not the knowledge of a Dryasdust, but a real living knowledge, always at his command and generously communicated to all who sought information from him. I remember well being immensely struck by this in a conversation I had with him ten years ago. We were talking of the Maritime Alps, which he had visited many years before, and from which I had just returned, and I shall never forget my amazement at the manner in which, without the slightest need of refreshing his memory, he discussed the topography of the remotest glens, never being at a loss for names or other minute details of a most intricate subject.

This marvellous knowledge of the Alps marked him out naturally as a leader when the taste for mountaineering began to spread. Though not, strictly speaking, one of the founders of the Alpine Club,

* *Alpine Journal*, vol. vi. p. 263.

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he joined it early in 1858, when it was only a few weeks old, and on March 31, 1858, received the honour of being elected its first President. Soon after, he became its first Editor, for it was under his name that the first series of 'Peaks, Passes, and Glaciers' appeared in 1859. Its success with the general public was very great; while for mountaineers it is of especial interest as being the original form of the 'Alpine Journal,' of which the first number was issued in 1863, after the further success of a second series of 'Peaks, Passes, and Glaciers' (1862), edited by Mr. E. S. Kennedy, who in 1860 had succeeded Mr. Ball as President of the Club.

Qualified thus by practical and literary knowledge of the Alps as no other man has ever been, Mr. Ball, on his retirement from the Presidency (in 1860), undertook his great work 'The Alpine Guide,' of which the three volumes appeared in 1863 (Western Alps), 1864 (Central Alps), and 1868 (Eastern Alps). This book is the 'Encyclopædia Alpina,' and the first of Alpine classics. Describing the entire chain of the Alps without reference to political boundaries, summarising the work of previous explorers, and letting fall numberless hints for future explorers, filled with a vast store of local botanical and geological knowledge gathered on the spot, and arranged according to an admirably clear system, it is undoubtedly the most valuable work on the Alps in all their aspects that has yet been published. I venture to quote the opinion which I have recently expressed concerning it;* 'Speaking for myself I may say that I have had over twenty years' experience of this guide-book, largely in those parts of the Alps least known even to Mr. Ball; and I wish to place on record my profound admiration of the amazing success with which the author has firmly grasped the main lines of the topography of the most unfrequented districts; so that all his followers have had to do has been to fill in the outline sketched out with so masterly a hand.' It has but one drawback—that it has not been kept posted up to date. The task of revision might well be taken up by the Alpine Club as the most appropriate tribute of respect it can pay to the memory of its first President and first Editor, who knew the Alps as no one else has ever known them, and who, full of years and honours, has now passed to his rest, after a life devoted to the advancement of the scientific, practical, and literary knowledge of the Alps, and of some of the other great mountain chains of the world. Amongst the mountains themselves, the name of the Cima di Ball, in the Primiero Dolomites, will preserve the memory of the greatest of Alpine explorers. W. A. B. Coolidge.

FRANCIS OTTIWELL ADAMS.

Francis Ottiwell Adams was born at Halifax, Nova Scotia, in 1825. He was educated at Rugby and Trinity College, Cambridge, called to the bar in 1852, and shortly afterwards entering the Diplomatic Service was appointed attaché at Stockholm in 1854. After filling posts at St.

* *Swiss Travel and Swiss Guide-Books*, p. 109.

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Petersburg, Washington, and Yeddo, he was promoted in 1872 to be Secretary of Embassy at Berlin, and while there was acting Chargé d'Affaires for some months in 1873 and 1874. At the end of 1874 he was transferred to Paris, and having been accredited Minister Plenipotentiary in the absence of the Ambassador, he acted in that capacity for various periods in each of the years from 1875 to 1881, when he was appointed Envoy Extraordinary and Minister Plenipotentiary to the Swiss Confederation. He was first British Delegate to the International Postal Congress at Paris in 1878 and the International Copyright Conference at Bern in 1884–85–86. He was created a C.B. in 1878 and subsequently K.C.M.G., and retired from the Diplomatic Service on a pension in 1888.

More than one of his old colleagues have told me that throughout the whole of Sir Francis' career he displayed the most untiring zeal and energy in his profession; but like much of the most important diplomatic work, what he accomplished was often of a kind which never came under the notice of the public. He possessed one of the most important qualities of a diplomatist, the power of viewing questions under discussion from an opposite standpoint to his own, and always seemed able to put himself in the place of those with whom he was endeavouring to transact affairs. He was singularly free from local or party prejudice; his thirty-four years of service in all parts of the world had made him a thorough cosmopolitan; and it was impossible to discuss any question in his presence without recognising his breadth of view, and noticing the impartiality with which he acknowledged the claims of those who held opinions entirely different from his own. It was the firm belief in his absolute fairness, and the instinctive knowledge that it was impossible to him to take a mean advantage, which gained for him the confidence of everyone with whom he came in contact during his diplomatic career. He was thus almost invariably able to settle a disputed point amongst his colleagues, or with the representatives of foreign governments, in a friendly informal way, without having recourse to official correspondence.

His wide sympathies led him to take a keen interest in the lives and surroundings of those whose country became his temporary home. After returning from Yeddo he wrote a 'History of Japan,' now out of print but still regarded as the standard work on the particular phases of history with which it deals; and in 1887 while British Minister at Bern he commenced to arrange with me the materials for 'The Swiss Confederation.'

There is certainly no post in Europe where a minister is brought so much in contact with officials who do not actually belong to the central government to which he is accredited. In other capitals a foreign representative has to deal almost exclusively with the Ministry or the Cabinet, but in Bern many questions arise which have to be referred to local officials in one or other of the twenty-two different cantons. And it can well be understood by anyone who ever met Sir Francis Adams, how his genuine kindliness of manner at once won the hearts of the Swiss. 'Nous avons toujours regardé votre Ministre beaucoup plus comme un ami, que comme le représentant d'un pouvoir étranger,'

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a late President of the Swiss Confederation has often remarked: a sentiment which thoroughly expresses the feelings with which Sir Francis was regarded by all sorts and conditions of the people. He was indeed as popular among the shrewd country-folk in the Oberland as among their representatives in the Palais Fédéral; and during the years he lived in their midst they would confide to him, with an absence of reserve rarely shown to a foreigner, their hopes and fears for the future and welfare of the little country they knew he loved so well.

In private life few men ever had such a wide circle of devoted friends as Sir Francis Adams. In Paris, at the Legation at Bern, and in later years at 18 Albemarle Street, he was surrounded by those who pursued many various callings in life, and who had perhaps little in common but the one firm bond which brought them together—the great esteem and regard they felt for their host. Many of those thirty odd years Sir Francis spent in the service of his country had been eventful ones. He had served in three of the greatest political centres of Europe, in St. Petersburg, in Berlin during the formation of the new Empire, and in Paris during Macmahon's presidency. He was a capital *raconteur*, and the various incidents of his wide travels possessed, as related by him, a great freshness and charm. His rooms were filled with many interesting souvenirs of his stay in foreign lands, each of which had some special history of its own.

It was in 1882 that Sir Francis first became acquainted with the High Alps; he ascended the Galenstock, crossed the Mönchjoch, and did many other excursions which were no mean performance for one who began his mountaineering career when nearly sixty years of age. In 1886 he was elected honorary member of the Alpine Club. He had the most intense delight in mountain scenery, and often referred with pleasure to the fact that from his windows at Bern the great peaks of the Oberland were constantly in sight. I well remember how he would rise from his writing-table in the Legation, and drawing aside the curtains gaze upon these snowclad giants in the starlight of a frosty winter's night; it was a picture of which he never seemed to tire. Not a year passed without his paying several visits to Grindelwald, where he was wont to speak of the Bär as his 'country house.' It was indeed pleasant to watch the eagerness with which one who had spent so many years at foreign courts and great capitals counted the days till it was time to start for that Oberland valley. And when the time came for Sir Francis to present his letters of recall, the thought that in the future he would be able to spend months instead of weeks in his favourite mountain haunts seemed in a measure to counterbalance those regrets everyone must feel at retiring from active service in a useful and honourable profession.

But this was not to be. During the first visit he paid to Grindelwald after resigning his post, Sir Francis returned to the Bär over-fatigued from an excursion, and the following afternoon he passed quietly away, the immediate cause of death being paralysis of the heart. In accordance with the wish he had often expressed he was laid to rest in the little churchyard at Grindelwald under the shadow of the great peaks he loved so well. The coffin, covered with Edelweiss and Alpenrosen,

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was carried shoulder-high by some of the 'old guard' of the Oberland guides, many of whom had often accompanied Sir Francis among the mountains. His successor, Mr. Scott, C.B., the staff of his old legation, and some of his old colleagues and friends from Bern were present; the President of the Republic sent a representative, one of the greatest marks of respect it is possible for the Confederation to give and an honour they but rarely bestow. Many of the guides and country-folk, who will long remember Sir Francis' kindly greeting as he passed their châlets, came to pay a last tribute of respect. Each one of the sad group who stood around that grave shared in the same sorrow, and the words with which Pfarrer Strasser concluded his funeral address found an answering echo in every heart, 'Edler Freund unseres Vaterlandes, treuer Freund unseres Thales, gut sollst du hier ruhen. . . . Dein Andenken lebt fort und fort in vielen treuen Herzen.'

C. D. C.

ALPINE ACCIDENTS IN 1889.

It is a matter for congratulation that the list of accidents this year, at any rate above the snow-line, is but a short one, and that no English traveller has lost his life by a mountain accident.

On July 14 two of the three persons of which a party was composed were killed while on the way from the Sonnblick inn (10,181 feet) to the Hochnarr, or Hohen-Aar (10,690 feet), and Heiligenblut, along the ridge between Carinthia and the province of Salzburg. The party consisted of Herren S. Bernatschek and Andreas Klein, and of the guide Pichler, of Heiligenblut. They had reached a point just beyond the Pilatusscharte (9,515 feet), when the travellers at the Sonnblick inn saw the three climbers suddenly lose their footing and slide rapidly for 330 or 440 feet (100 or 150 mètres) down the steep snow-slopes falling to the Hohen-Aar Glacier, or Pilatus kees, on the Salzburg side of the ridge. Assistance was at once despatched. It was found that Pichler had been killed on the spot, Herr Klein surviving for a few minutes only, while Herr Bernatschek escaped with comparatively trifling injuries. From the account of the survivor (in the 'Oesterreichische Alpen-Zeitung' for July 26, pp. 180–1) it appears that Pichler had (without the knowledge of his Herren, who trusted entirely to him) taken an unusual but shorter way, so as to gain the Goldzechscharte and Hochnarr more quickly, though the Sonnblick landlord had warned him against doing this. The guide slipped on a bit of ice projecting from under the soft snow, and, as they were all roped together, pulled his two companions out of the steps in the deep snow. None of the party had put on their 'Steigeisen,' or crampons, but it would seem that the guide neglected to cut steps in the ice, and when he slipped his Herren were unable to resist the shock of his fall. As the two travellers were firmly planted in deep snow, the fact that they had not put on their 'Steigeisen' is irrelevant. Pichler should certainly either have put

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his on or have cut a step in the ice, and it seems clear that his carelessness was the sole cause of this sad accident.

On August 13, in uncertain weather, M. Robert Morel, of Lausanne, with the guide Maurice Gaudin, of Sion, started from the little inn on the Sanetsch Pass (between Sion and Saanen or Gessenay) at 9 A.M., with the intention of ascending the Oldenhorn (10,250 feet) and of descending to Ormonts Dessus by the Sex Rouge glacier, a perfectly easy and frequently undertaken excursion. At 10.55 they reached the edge of the great Zanfleuron glacier and halted for a few minutes to put on the rope. They then proceeded along the glacier, having recourse to map and compass to find their way, as the weather was getting worse and the mist was rapidly closing in upon them. They had been on the glacier for about 50 minutes when all of a sudden Gaudin fell into a crevasse, and, the rope not being taut between the two members of the party, M. Borel felt himself drawn nearer and nearer to the chasm. He planted his alpenstock firmly in the snow and clung to it with desperation. Gaudin called out six or seven times to M. Borel to pull him up, but made no effort to help himself. M. Borel managed to pull him up very slowly and cautiously, but could not raise him above the bit of the snow-bridge which had not fallen in. He therefore fastened the rope firmly round his alpenstock, still planted deep in the snow, cut the bit of rope by which he was tied, and approached the edge of the chasm, exhorting Gaudin not to lose courage. But no answer came from the guide, so, feeling certain that he was dead, and being much exhausted, M. Borel returned to the inn, which he regained at 2 P.M. A search party sent out at once was unsuccessful, the reason not being stated. Nothing was done on the 14th; on the 15th a party of persons without any experience of the mountains failed, and it was only on the 16th that M. Albert Franzoni (of whose narrative, printed in the 'Gazette de Lausanne' of August 21, this account is a summary), with M. Joseph de Lavallaz and four resolute companions, discovered the body. It was hanging about a yard down the crevasse, quite frozen, and the rope tightly fastened round the waist. Hat, knapsack, and ice-axe were wanting, and the coat was turned up over the head and arms. As the hands were quite free from bruises or scratches, it would seem that the poor fellow had made no effort to help himself. Death was probably due to cold and asphyxiation. M. Borel's narrative was confirmed in all points by the state of things discovered by the search party, and he seems to have done all that could be done unaided, although, unfortunately, he did not succeed in saving his guide's life.

These two accidents have several points in common. Neither occurred on any very lofty or difficult mountain—indeed, in both cases the scene of the fatal occurrence was not very far from a frequented inn, and a good path. Nor were the members of either party very experienced mountaineers. Both cases, too, seem, according to the published accounts, to belong to the very small class of fatal accidents in which the fault can be clearly proved to have lain with the guide of the party and not with the travellers. A traveller is often careless, and there

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may be some excuse for him; but a guide is bound by his profession to be always on the look-out, and, unless overtaken by some unexpected fall from above, or a tempest, cannot be excused for carelessness, even though it be for a moment. In the Pilatusscharte case, the guide took a short cut, and neglected to cut steps in a bit of ice, steps being all the more necessary because this bit of ice came in the middle of a snow slope. In the Zanfleuron case, the guide either did not notice that his traveller was not keeping the rope taut between them, or neglected to warn him to do so. Thus, in both cases, well-recognised and obvious precautions were neglected by the leaders of the respective parties, and this neglect is rendered even less inexcusable by the fact that there were no great difficulties on the spots where the mishaps occurred. It is the foremost duty of a guide to be on the watch at all times, particularly when there seems to be no danger.

The remains of an unknown man were found last summer on the Vernagt Ferner (Oetzthal group) in a rather inaccessible place. Besides bones, there was discovered a passport bearing the date 1884, and the Christian name William, the surname being illegible, a flask with an inscription in English on it, and some small coins in a purse. The victim is believed to be an elderly travelling mechanic who was seen four years ago quitting the Hochjoch path at Rofen late in the afternoon, and who probably descended by the left bank of the Vernagt torrent to a spot where further progress was impossible. A violent storm and fall of snow no doubt hindered him from getting back on the right track, and he was frozen to death.

But though the fatal accidents above the snow-line are few in number this year, there has been an unusual succession of narrow escapes and adventures; perhaps due in part to the bad state of the snow, in consequence of the bad weather which prevailed throughout nearly the whole summer, but certainly also to carelessness and neglect of the ordinary well-tried precautions. M. and Madame Franciscique Gabet, of Lyons, fell with their guide into a crevasse while crossing the Alphubel Pass, and were only saved by the arrival of another party. Both travellers suffered very severe injuries. An English climber when making the ascent of the Piz Popena from the Cortina side with the guide Barbieri was carried down some way by a great rock, which gave way when grasped by his guide Barbieri; the guide sustained serious injuries to the head, but the traveller got off more easily. On August 13 a Viennese gentleman, when a little below the Cristallo Pass, after having made the ascent of Monte Cristallo, slipped on a steep snow-slope, and fell down headlong into a crevasse, from which his companion and his guide were luckily able to rescue him alive, though a good deal hurt. Two or three hours later one of three Viennese gentlemen, having made the same ascent without guides, slipped on precisely the same place, and sustained very severe injuries by striking against the rocks. On September 20 a German gentleman and the well-known guide, Peter Dangl, of Sulden,

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were crossing the bergschrund at the base of the final peak of the Monte Cevedale, when the fresh snow gave way, and they were both thrown over the slope on the Cedeh Glacier side. Dangl was only slightly hurt, and was able to rescue his Herr, who had broken several ribs and hurt his wrist. The same day two German gentlemen and two Trafoi guides were carried away by the fresh snow giving under their feet just before they gained the upper plateau of the Ortler, and precipitated over a high icewall. The travellers were unhurt, but one of the guides, Johann Mazzagg, was rendered unconscious, and sustained internal injuries; while the other, Matthias Thöni, broke his right thigh. Luckily two parties had been detained in the Payerhütte by a violent storm, so that their guides were able to go to the rescue of their comrades, whom they were watching on their ascent. On September 3 a Pitzthaler guide, Alois Dobler, broke his collar bone in saving the life of an English traveller (one of a party of nine with eight guides), who, while on the way from Sölden to the Wildspitze, had slipped on a steep snow-slope between the Karlesferner and Retterbachferner. His injuries were due to having been thrown violently against the moraine after a rapid descent down the snow-slopes.

Without counting the numerous cases in which country people have perished while searching for edelweiss or other flowers, there have been several fatal accidents below the snow-line. A medical student from West Prussia, Herr Wladislaus Graducewsky, left the hamlet of Birkenstein alone at 4 P.M. on the afternoon of April 29 last to ascend the Wendelstein (6,067 feet). As he was not heard of again, search was made, and his body was discovered a week later. He had been overtaken by night, had lost his way, and had fallen over the Bockstein cliff into the mountain torrent in the Dickelgraben, half an hour below the little inn. On June 22 Lieutenant Stanislaus May was killed on the ridge between the Wilkopf (5,135 feet) and the Laffeldkopf, in the Salzburg Alps. A bit of rock gave way under his feet, and he fell over a precipice, being killed at once. He was engaged on the Government survey of the district, and was buried at Lofer, where he was well known both to natives and to visitors. On the evening of July 26 Herr Fässler, of Appenzell, having taken some refreshments at the Meglis Alp inn (4,856 feet), started thence, despite the unfavourable weather and the representations of the landlord, to mount to the inn on the Säntis (8,216 feet). He seems to have proceeded a little way beyond the Wagenlücke, but was unable to battle any longer with the elements. His frozen body was found on the 29th, lying on the path which he had not missed. On August 4 Herr Bösch, of St. Gallen, while making an excursion on the flanks of the Säntis, in the direction of the Staubernfirst, was attacked by faintness, became unconscious, fell over a rock-wall, and rolled down some grass slopes. His injuries did not seem to be severe, but he succumbed to them that night. The unfortunate gentleman is said to have been subject to such fainting fits, though his companions were not aware of this fact.

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On August 7 a young man lost his life in the Stubai Alps in a rather mysterious fashion. Herr Martin Hertz, a law student from Breslau, made the acquaintance of a certain Herr Julius Blankensee, a 'Concertmeister' from Nürnberg, during the diligence journey from Innsbruck to Vulpmes. They agreed to join forces, and that night, with Johann Maier of Neustift (one of the licensed guides of the district), went up to sleep at the Nürnbergerhütte (7,710 feet). Next morning the three started at 5 A.M., and at 7 A.M. reached the Maierspitze (9,109 feet). After a long halt, they started on their way to the Dresdenerhütte (7,874 feet), and for that purpose descended into a glen of the upper Sulzenauthal. This glen comes down from the Wilder Freiger to the little plain of Grünau, where it joins the main valley, which, from the Grünau plain, descends by a very steep rock step or precipice of 200 mètres (=656 feet) to the lower reach of the same valley.* Maier, the guide, had never passed this way before, and it was only after losing and finding the way several times that the party reached the stream coming from the Wilder Freiger glacier. Maier went off to look for the right way, but, on returning after a quarter of an hour's absence, found Herr Blankensee alone a little way from the spot where he had left his two travellers. Herr Blankensee assured Maier that Herr Hertz had crossed the stream and had disappeared in the mist. The guide then carried Herr Blankensee across the stream and searched for an hour for Herr Hertz, but in vain. The two then continued their way towards the Dresdenerhütte, but were benighted, and next morning returned to the Nürnbergerhütte, where Herr Blankensee made a short entry in the Travellers' Book, in which he made no mention of his comrade. Maier went down with him to Ranalt, where the guide made fruitless enquiries after Herr Hertz. In Neustift, Herr Blankensee paid him half his wages, and departed, asserting in Vulpmes that he had separated from his comrade. Maier narrated all the circumstances to the landlord in Neustift, but, owing to the absence of the *guide-chef*, no search party was organised. Some friends of Herr Hertz then arrived and employed guides to look for the unfortunate young man. His body was at last found, on September 4, on the steep rocks above the lower Sulzenau valley, between the Freigerbach and the Sulzenaubach. It was very much mutilated, but all Herr Hertz' valuables were found on it. A judicial enquiry is being made into the conduct of Herr Blankensee and the guide Maier, which may throw some light on this sad and mysterious occurrence.

On August 22 three young men crossed the easy pass of the Tuxerjoch (7,664 feet) from the Schmirnthal to the Zillerthal, but two of them, brothers, named Skorpil (sons of an Innsbruck engine driver), lost their lives in a manner of which two different accounts are given. According to one authority they slipped while climbing some slopes in search of edelweiss. But according to the more detailed narrative they were overtaken by darkness; one

* See illustration No. 4 in Barth and Pfaundler's classical work *Die Stubaier Gebirgsgruppe hypsometrisch und orographisch bearbeitet* (Innsbruck, 1865), and the description on p. 85 of the same book.

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slipped and fell down a precipice, injuring himself much, while his brother going to his aid slipped also, and was killed outright, the former succumbing later to his injuries. On September 3 Pfarrer K. Stach, of Pfronten, who had just taken part in the opening of a new club hut, was climbing up the Aggensteinspitze (6,506 feet), near Füssen, when shortly before reaching the summit he fell over a precipice of 650 feet, and died three-quarters of an hour after he was found by a friend, who had stayed behind to pick edelweiss. It is said that the fall was due to a stroke.

On September 29 three young men left Gstatterboden in unfavourable weather to ascend the Plan Spitze (6,946 feet) in Styria, by the difficult route of the Peternpfad. One soon turned back, but the others—Herr Karl Domenigg, of Gratz, and Herr Hans Wiesler, of Knittenfeld—pushed on. Herr Wiesler was particularly anxious to make the ascent, but became much exhausted in consequence of the bad weather and the difficulties of the climb over iced rocks. Not far from the summit he stayed a little way behind his companion, but the latter, coming back after an hour's absence, was unable to find him. He searched long in vain, and was forced to pass the night in a lonely hut—the Koinzenalm. Next morning he started again, and about half an hour from the hut found, in a very exhausted state, Herr Wiesler, who had been slowly following his tracks in the snow. Herr Domenigg made him as comfortable as possible in the hut, gave him all the provisions that were left, and, charging him not to leave the hut, went over to Johnsbach in search of help. Very bad weather prevented the relief party from setting off till the next morning, but they found only a bag in the hut, Herr Wiesler having started off by himself. It was only on October 3 that his body was found, not very far from the hut, in the direction of a precipice by a waterfall. He had missed the very difficult and rarely traversed path, had slipped and fallen down, and had probably been frozen to death, as the only severe injuries to the body were on the hands. Herr Wiesler, who was a bookkeeper at Knittenfeld, is said to have been an experienced climber.

The 'Standard' of October 20 contained the following telegram from Berlin:—

'Dr. Hadlich, a physician belonging to Pankow, a suburb of Berlin, who had been living for some weeks by the Lake of Geneva, started several days ago on an excursion in the Alps. He has not returned, and nothing has since been heard of him. It is feared that he has been surprised by the mist while up one of the mountains, and has lost his life while attempting to reach a place of safety.'

Some other deaths on the mountains may be recorded here, though they cannot be classed as Alpine accidents, properly speaking. On August 6 Herr C. Jellinghaus, of Halle, was descending, with two Hallstadt guides, from the Dachstein, through the Schwadring gorge to the Austriahütte. The rope had been taken off, as all difficulties had been left behind, when Herr Jellinghaus, while walking between his guides, fell forward on the leading one, and knocked him down, the two

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rolling a little way together. The guide was only slightly bruised, but Herr Jellinghaus, a man of sixty years of age, was killed. He was a good walker, according to the report of his guides, and must have been seized with a sudden fit of illness, as he was not observed to slip, and the spot where the accident occurred is perfectly easy. On August 21 Herr Heinrich Willmann (son of Professor Willmann, of Prague), having made with a friend the ascent of the Rofan Spitze (7,405 feet) above the Achernsee, near Jenbach, was descending by the Hoch-Iss, and had nearly completed the expedition, when he was seized with faintness, and fell down dead. The cause is said to have been excessive fatigue. On September 1 Herr Raillard, of Basel, who had done much good work among the Swiss mountains, died suddenly while taking a walk near Amden, not far from Wesen (St. Gallen); and on September 3 Mr. J. F. Bottomley Firth, M.P. for Dundee, and deputy-chairman of the London County Council, died suddenly of heart disease a short distance beyond the little inn on the Flégère, near Chamonix.

NEW EXPEDITIONS IN 1889.

[The expeditions recorded in the following pages are believed to have been made for the first time by English mountaineers. In cases where foreign climbers have preceded English travellers, references to the original accounts have, as far as possible, been given. The most remarkable first ascents made by foreign climbers during the past summer are also included.]

Dauphiné District.

SOMMET DE L'AILEFROIDE FROM THE WEST (3,925 mètres=12,878 feet). BRÊCHE DES FRÈRES CHAMOIS (about 3,456 mètres = 11,319 feet). *August* 3.—MM. Félix Perrin and A. Reynier, with Pierre Gaspard, père, Christophe Clot, and J. Turc, discovered a new route up this peak, though they did not quite attain the summit. Starting from the Carrelet club hut, they followed the usual route of the Col du Sélé for 1½ hrs. to the lower part of the Pilatte Glacier, beyond the Combe Rouge of M. Duhamel's map, and as far as the base of the rocks supporting a small round glacier on the W. flank of the peak which was named the 'Glacier Gris' (from the colour produced by the stones lying on it). Climbing up these rocky slopes by sheep tracks they gained the glacier, and crossed it towards the north to the rocky ridge dividing the Glacier Gris from a small elongated glacier, which is an affluent of the Glacier de la Coste Rouge (2½ hrs.). Ascending the S. side of this ridge diagonally by means of small rocky terraces and snow-bands, they attained (2½ hrs.) the Brêche des Frères Chamois, a deep cleft at the foot of a lofty rocky needle, just where the Ailefroide ridge joins that coming up from the Sommet du Sélé (3,320 mètres). Instead of effecting the perfectly easy descent from the pass down the extreme W. branch of the Glacier de l'Ailefroide, the party crossed the head of this branch glacier at a level, climbed over a rocky spur separating it from the final rocks of the Ailefroide, and by a number of

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small rocky ridges and snow-gullies worked their way up to the crest of the western arête of the peak (2½ hrs.). The lateness of the hour and the bad condition of the snow forced the party to return to the Carrelet by the same route just after they had rejoined the usual route up the Ailefroide from the south, and were only separated from the highest summit by a long snow-ridge.

On the occasion of the attempts on the peak from the W. made, on August 6, 1885, by MM. Leser and P. Engélbach, and Herr L. Purtscheller, and, on July 23, 1888, by M. J. Maitre, the small elongated glacier, mentioned above, which is well seen from the Vallon de la Pilatte, was nearly or quite attained.

Central Peak of the Sommet de l'Ailefroide (*c.* 3,880 mètres =12,730 feet). *August* 8.—Monsieur A. Reynier, with Pierre Gaspard, père, Christophe Clot, and J. Turc, made the first ascent of this peak. Having started from the Refuge Puiseux, and gained the left bank of the Glacier de l'Ailefroide (2¾ hrs.) by the usual route up the Ailefroide, the party mounted due north over the glacier to the foot of the rocky spur descending from the central peak to the south (1¾ hrs.). Following a corniche up the rocks around a rock tower in a N.W. direction, and then the rocks themselves, and a snow-gully, the crest of the final ridge was attained just W. of the peak, which was reached along the ridge (2¼ hrs.).

Brêche Lory (about 3,950 mètres=12,960 feet). *July* 9 —Monsieur Maurice Durouchoux, with Pierre Gaspard, père, and J. Turc, made the first passage of this col, which is the conspicuous notch between the Dôme de Neige des Ecrins (3,980 mètres) and the Pic Lory (4,083 mètres). Having gained the Col des Avalanches from the Carrelet club hut with the intention of ascending the Ecrins, they changed their plans, and, crossing the rocky S.W. buttress of the Pic Lory, gained the upper basin of the N. branch of the Glacier du Vallon de la Pilatte. Mounting this glacier to its very end, they climbed up by a gully to a great snow-band which crosses the rocks below the brêche (1 hr. from the glacier), followed this snow-band to a second couloir, climbing directly up which they reached the brêche. On the other side the route soon joins that from the Ecrins. The brêche was first gained from the N. side by Messrs. W. Mathews and Bonney on August 26, 1862,* on the occasion of their attempt on the Ecrins, but the S. side had not been climbed before 1889.

Aiguille du Plat by the Eastern Arête (3,602 mètres=11,818 feet). *September* 9.—Messrs. A. L. Mumm and C. A. James, with Clemenz Zurbriggen, of Saas, and C. Roderon, of St. Christophe, ascended this peak by the crest of the E. arête, Monsieur H. Duhamel, on July 10, 1881, having climbed it along the S. face of that arête.† Having reached, in 3 hours from Les Etages, the foot of the small glacier descending from the Col de Burlan between the Aiguille du Plat and the W. peak of the Aiguille du Soreiller, they turned to the

* *Alpine Journal*, vol. i. p. 73; Mr. Bonney's *Sketches in the High Alps of Dauphiné*, pp. 19, 20.

† *Alpine Journal*, vol. x. p. 346.

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left and ascended some snow-slopes for 35 minutes to the S. face of the E. arête, below the lowest point on that part of the ridge. Traversing this face nearly at a level for 30 minutes, the party gained the crest of the E. arête, but were soon forced back on the face in order to turn on its S. flank a very sharp and conspicuous rock-pinnacle, regaining the arête just beyond it at a point where it bends sharply to the left and rises steeply in a short slope of hard snow. Mounting this and the ridge beyond, and then turning a great mass of rock by a ledge on the N. face, they gained the summit of the peak in about 2 hours from the time the arête was first struck, to the E. of the rock-pinnacle. The rocks were easy, though pretty steep.

Graian Alps.

Pointe de l'Echelle (3,432 mètres = 11,260 feet). *July* 30.—The Rev. W. A. B. Coolidge and Mr. Frederick Gardiner, with young Christian Almer and his brother Rudolf, made the second ascent of this peak. Starting from the Polset chalets, they followed the path to the Col de Chavière for 1 hr. 20 min., then bore N.E. past the lake and over stones to the edge of the glacier on the south-west side of the peak, and across it to the base of the south arête (2 hrs. 35 min.). Very soft and deep snow lying on rocks led them in 1 hr. 15 min. to the crest of the south arête, which was followed in 55 minutes (there being no difficulty save the vast amount of soft fresh snow) to the cairn on the summit. The view was very interesting. The party returned by the same route, reaching Modane in 4½ hours from the summit, 1 hr. 5 min. of which were consumed in regaining the glacier.

The first and apparently only previous ascent of this peak was made on July 14, 1884, by MM. Puiseux, without guides, the same route having been taken on both occasions.*

Grande Motte from the South (3,663 mètres = 12,018 feet). *August* 3.—The same party, starting from the chalets of Entre deux Eaux, followed the track to the Col de la Leisse for some time, then struck up to the north and halted for breakfast on a green mound not far from the figures 2,865 on the French map (1 hr. 45 min.). Thence they climbed straight up the steep but easy south buttress of the peak, over loose rocks and patches of snow, no real difficulties being encountered, though the slope was rather steep, and, after several halts, amounting to about 35 min., gained the great cairn on the summit of the buttress at the figures 3,560 on the map (2 hrs. 50 min.), whence a pleasant and easy ascent over snow slopes brought them to the highest snow crest (20 min.). The return to the breakfast place by the same route took 1 hr. 45 min, and Tignes was reached by the Col de la Leisse the same evening.

The peak has hitherto been always climbed by the great glacier and snow slopes on its east side; but the new route is strongly to be recommended when it is probable that the snow on the E. slope is in bad condition, and it is certainly far more direct than the old way.

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* *Annuaire du Club Alpin Français*, 1884, pp. 3–15.

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Aiguille Rousse by the North Arête (3,482 mètres = 11,424 feet, French map; 3,481 mètres = 11,421 feet, New Italian Survey). Col d'Oin (about 3,230 mètres = 10,618 feet). *August* 6.—The same party, starting from the hamlet of La Val d'Isère, crossed by a new pass to the mineral springs of Ceresole, making a new route up the Aiguille Rousse on the way.

From La Val they followed the Col de la Galise track to beyond the gorge (2 hrs.), and then continuing up the main Isère valley mounted, by the moraine on the right bank of the great tongue of the Glacier de la Vache which descends into the valley, to the upper edge of that extensive snow field (1 hr. 40 min.). Crossing the glacier to the S.E. in order to visit the Col de la Vache (35 min), they then crossed back, to the west, to the north foot of the rock and snow north arête of the Aiguille Rousse (35 min.),* which was climbed without difficulty to the summit of the peak (1 hr.), whence the view is most superb.

Returning to the north foot of that arête (35 min.) they crossed the glacier once more, towards the east, so as to gain (20 min.) the well-marked depression which is immediately at the south foot of the Cima della Vacca (3,277 mètres) of the Italian map. This point, a low ridge of débris separating two glaciers, had been reached by Mr. Coolidge from the French side on August 31, 1887. It was now to be turned into a pass, and was christened Col d'Oin. The descent down the glacier on the Italian side was at first quite easy, but the party were gradually forced by crevasses to the rocks of the north extremity of the Cima d'Oin (3,184 mètres) of the Italian map, by which the lower plateau of the glacier was gained, the ice being quitted on the right bank in 40 min. from the col. A wearisome descent down moraine led the party in 25 min. to the path coming from the Alpe Rocce, which was followed down the glen below the Carro Glacier, a short cut over the hill-side by the Alpe Trumajet bringing them to the hamlet of Chiapili (55 min.), and in 1 hr. 55 min. more to Ceresole.

The topography of the range between the Galise and the Carro passes has been thoroughly cleared up by M. Henri Ferrand in an admirable article which appeared in the 'Annuaire du Club Alpin Français' for 1888, pp. 58–113. He shows conclusively that the true Cima d'Oin is neither the peak to which the French map assigns the impossible height of 3,514 mètres, nor that marked 3,184 on the Italian map, but the black, shaly summit called Cima della Vacca (3,277 mètres on the Italian map, and first ascended by Mr. Coolidge on August 31, 1887 † The true Cime de la Vache is the point marked 3,189 on the French map. Just north of it is the true Col de la Vache, separated from the Col de la Galise by the low humps called Pointe du Grand Cocor on the French map.

Punta del Broglio (3,455 mètres = 11,336 feet). *August* 8.—The same party made the first ascent of the highest pinnacle of this peak. Having gained from Ceresole the western Col du Grand Etret (5 hrs. 5 min. walking), they walked thence past the eastern col of that name (on which were found in perfect condition the cards of Mr. Fresh-

* See *Alpine Journal*, vol. xiii. p. 407. † *Ibid.* vol. xiii. p. 407.

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field's party which made the first passage on July 20, 1867) to the south foot of the Punta del Broglio (30 min.). They mounted by the easy débris and snow slopes on the west side of that peak to the base of the four great rock pinnacles which form its highest crest. The two northernmost of these are lower than the two to the south. The most southerly of all was attacked from the gap between it and its rival to the north. It rose nearly precipitously in a bold aiguille of about 60 feet in height, and its ascent was excessively difficult, but was accomplished successfully owing to the determination of Christian Almer. Fortunately the rock is perfectly firm. This pinnacle proved to be about 10 or 12 feet higher than its neighbour to the north, on which, but a stone's throw away, rose the small cairn built by Signor Felice Montaldo, who ascended it on June 21, 1877, with Antonio Castagneri of Balme, apparently from the same gap.*

The descent of the highest pinnacle was worse than its ascent, and 40 minutes were required before the whole party was reassembled in the gap, whence the south foot of the peak was regained in 55 minutes, and the Rifugio Vittorio Emanuele II. by a long traverse in 1 hr. 55 min. more.

Punta Bianca (3,801 mètres=12,471 feet, New Italian Survey: 3,793 mètres=12,445 feet, Paganini †). *August* 12.—The same party made what is believed to be the first ascent of this peak, which lies immediately to the south of the Grivola. Starting from Cogne, they followed the usual Grivola route to the edge of the Trajo Glacier (4 hours), and thence followed last year's route ‡ over snow slopes to the Punta Nera (3,692 mètres—1½ hours). They then made their way along the ridge between this peak and the Punta Bianca. This presents no real difficulties, but on August 12 a very high wind made it nearly impossible to keep on the crest, the southern side of which was mainly followed. Progress was consequently slow, and 55 minutes (½ hour would suffice under ordinary circumstances) were required to reach the snowy dome of the Punta Bianca, whence there was a startling view of the Val Savaranche, far below. Descending by the N. ridge to the depression between the peak and the Grivola, which is often called Col de la Grivola, the party descended by the slippery and steep slate slopes (bearing always rather to the left) to the Trajo Glacier, regained in 1 hr. 40 min. from the peak, the rocks being very wet owing to a violent storm. In 35 minutes the glacier was quitted at the usual place, and Cogne reached in 2 hrs 10 min. more.

As the Punta Bianca is a snow peak with no rocks near by, no cairn could be built. No traces of any previous ascent were found, and the peak does not appear in Signor Vaccarone's very complete 'Statistica delle Prime Ascensioni' even in its latest form at the commencement of vol. ii. of his 'Guida delle Alpi Occidentali.' No

* See the brief but sole published notice in Signori Vaccarone and Nigra's *Guida Itinerario per le Valli dell' Orco, di Soana, e di Chiusella*, p. 84, and textually reproduced in the second edition of Signori Vaccarone and Martelli's great *Guida delle Alpi Occidentali*, vol. ii. p. 203-4.

† *La Fototopografia in Italia*, Rome, 1889.

‡ *Alpine Journal*, vol. xiv. p. 146.

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references to the peak seem to occur in Alpine literature, so that the 1889 party feel justified in claiming, at least provisionally, to have made the first ascent.

A very easy excursion from Cogne, and one commanding most wonderful views, would be to make the round of the ridge enclosing the Trajo Glacier to the south, starting from the point where the glacier is usually reached (Col du Pousset), passing over the Punta Rossa (11,457 feet, climbed by Messrs. Sedley Taylor and Montgomery in 1865 *), Punta Nera (12,113 feet), and Punta Bianca, and then returning to Cogne, or descending to Val Savaranche by the Col de la Grivola.

Punta Lavina from the West (3,308 mètres = 10,854 feet). *August* 14.—The same party, starting from Cogne, made a new and direct route up this peak, which, from its position, far to the east of the main Paradis group, commands an unusually extensive and interesting view. They followed the ordinary path of the Col de Bardonney, past the chalets of that name (2 hrs. 40 min.), and for 35 minutes more. Then striking up to the east they mounted by very stony and wearisome slopes to the edge of the Lavina Glacier, reached (50 minutes) at the point where the Italian map places the figures 2,757. Crossing the glacier to the base of the great snow couloir which divides the two summits of the Lavina (40 minutes), they succeeded in crossing the enormous bergschrund at the base of the N. peak, then traversed the couloir to the foot of the S. and higher peak, up the easy and broken rocks of whose W. face they climbed direct to the cairn on the top (1 hour 5 minutes from the bergschrund). They descended across the E. face, bearing gradually to the left, gained (1 hr. 15 min. from the summit) the Col des Eaux Rousses, and followed the King's hunting path from the Bocchetta Scaletta to the point where it joins the track from the Bardonney chalets (1½ hours from the col), just below the waterfall between the huts and the bridge at Bosc. 1½ hours sufficed for the return thence to Cogne. By this expedition a fine new one-day excursion was added to the many already existing round Cogne, for hitherto it has been necessary to make a great détour in order to attain this peak, the most easterly outlier of the Paradis group.

Rossa Viva, or Roccia Viva, from the East (3,650 mètres = 11,976 feet, Paganini). *August* 17.—The same party discovered a new, direct, and perfectly easy route up this grand peak, which is so conspicuous from just below the village of Cogne

Starting from the new club hut known as the Rifugio del Piantonetto, above the Muanda di Teleccio, they mounted in a westerly direction over many stones, big and small, to the left bank of the small Rossa Viva Glacier (1 hour). Ascending this glacier to very nearly its N. extremity (35 minutes), they turned sharply to the west and ascended a great snow couloir which seams the east flank of the Rossa Viva. The snow was in good condition, and no difficulties were encountered, so that the N.E. ridge of the peak was gained in 1 hour from the base of the couloir. Thence an easy ascent of 20 minutes up a snow slope (which might at

* *Alpine Journal*, vol. i. p. 444.

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other times be ice) led the party to the curious crater-like summit, which encloses a frozen lake of considerable size. Thus not quite 3 hours' walking had sufficed to reach the peak, though a long and tough struggle had been anticipated. The day being absolutely cloudless, the view was of the most perfect character, including everything between the Finsteraarhorn and the Viso. The peak is certainly and undoubtedly higher than the Becca di Gaÿ (as already pointed out by Mr. G. P. Baker, who ascended both peaks on two successive days), though the new Italian map assigns only 3,630 mètres to the Rossa Viva and 3,670 mètres to the Becca di Gaÿ, but Signor Paganini, in the map annexed to his already cited work, more accurately assigns 3,650 mètres to the Rossa Viva, and 3,623 mètres to the Becca di Gaÿ. After 2½ hours' enjoyment of the marvellous panorama spread before their eyes the party began the descent, which was effected by precisely the same route as the ascent. The Rifugio was reached in 1 hr. 45 min. walking, the details being as follows: to point where N.E. arête is left, 5 minutes; base of couloir, 35 minutes; off ice, 25 minutes; to hut, 40 minutes.

This peak has been attained but twice previously. On July 4, 1874, Signor Martelli, with J. J. Maquignaz and S. Meynet, made the first ascent, ascending direct from Cogne by the precipitous N. face to the W. arête (about 100 mètres above the Colle Baretti, between the Rossa Viva and the Becca di Gaÿ), by which he gained the summit in 13 hours from Cogne, descending by the same route.* The second ascent was made on August 10, 1881, by Mr. G. P. Baker (whose card alone was in the cairn in 1889), with Ulrich Almer and Johann Jossi —his party taking 5½ hours from the chalets of La Motta, ascending the peak by the S. face, and complaining of falling stones.†

There has been a certain amount of confusion as to the Rossa Viva. Mr. Bonney (in his panorama from Mont Emilius in Ball's 'Western Alps,' p. 163; and also in another privately printed one taken from the Grivola, both dating from 1862) called the Becca di Gaÿ by the name of Western Rossa Viva, and named the true Rossa Viva the Eastern Rossa Viva. The Gaÿ is called Rossa Viva in Mr. Reilly's panorama from the Coccagna.‡ After the Becca di Gaÿ received its present name it was proposed that the peak 3,630 should be called the Western Rossa Viva, and that of 3,552 the Eastern Rossa Viva (so by Dr. Baretti in his article, pp. 331, 336, and map in Nos. 10 and 11 of the 'Bollettino del C.A.I.' 1867), and this nomenclature is also adopted in the 'Guida Itinerario per le Valli dell' Orco, di Soana, e di Chiusella' (1878), pp. 93 and 98. The latter peak is, however, cut off from the former by a very deep cut in the ridge between them, and it has, therefore, been suggested § that it should retain the name of Testa di Money (given to it on August 10, 1885, by Messrs. Coolidge and Yeld on occasion of the second ascent,‖ the first ascent having been made by Signor Martelli on July 2, 1874),

* *Bollettino del C.A.I.*, 1886, pp. 93–6.
† *Alpine Journal*, vol. x. p. 357; vol. xi. p. 23, and card found in cairn.
‡ *Ibid.* vol. vi. p. 110.
§ *Bollettino del C.A.I.* 1886, p. 92.
‖ *Ibid.* vol. xii. pp. 416, 512.

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and that the name of Eastern Rossa Viva should be given to a snowy projection on the E. ridge of the true Rossa Viva. But Signori Vaccarone and Martelli, in the new edition of their 'Guida delle Alpi Occidentali,' vol. ii. pp. 192–3, have adopted a scheme which is far the best as yet proposed and which it is to be hoped may be generally adopted. According to their plan the name Rossa Viva or Roccia Viva is to be henceforth applied to but one peak—that marked 3,630 mètres on the Government map—and thus takes in the entire ridge or mass between the Colle Baretti and the deep cut at the head of the Rossa Viva Glacier. The peak 3,670 retains the name of Becca di Gaÿ, and that of 3,552 its designation of Testa di Money. In this way the confusing distinction between an Eastern and a Western Rossa Viva is entirely done away with.

Gran Sertz by the N. Arête (3,510 mètres = 11,516 feet, New Italian map; 3,553 mètres=11,657 feet, Paganini). *August* 19.—The same party, starting from Cogne, followed the King's path towards the Col de Lauzon as far as the royal hunting lodge (2¾ hrs.). Thence they mounted, over grass and moraine, to the N. end of the Glacier du Lauzon (55 min.), which they mounted in a S.W. direction (seeing a herd of seventy chamois close at hand) to the ridge between the points marked 3,510 and 3,147 mètres (45 min.). They then ascended over snow slopes towards the west, and, by some rocks which were more troublesome than they looked, gained (50 min.) the N. and lower end of the highest crest of the Gran Sertz. An interesting scramble along the jagged ridge brought them in half an hour to the southernmost and higher end of the crest, a curious rock half suspended in the air. The descent was made by the E. ridge and the snow slopes of the Lauzon Glacier, the King's hunting lodge being regained in 55 minutes from the summit, and Cogne in 1 hr. 40 min. more. No cairn was found on the summit, and but one previous ascent seems to have been recorded —that of Mr. Yeld, with Alphonse Payot, on August 9, 1879. This party went up by the S. ridge from the Col de l'Herbetet, and down by the E. ridge and Lauzon Glacier.* The peak bears no name on the Italian map; that of Gran Sertz is taken from Mr. Yeld's map.†

Punta Crevasse (3,303 mètres = 10,837 feet, New Italian map; 3,307 mètres=10,850 feet, Paganini). *August* 21.—The same party made the first ascent of this peak, on their way from Cogne to Aosta by the Col de Trajo (2,872 mètres) and Vièyes. Starting from Cogne, they gained (3 hrs. 40 min.) a point 150 or 200 feet higher than and to the south of the Col de Trajo. They then followed the ridge to the south, in the direction of the peak, but in about 25 minutes were forced by the numberless rock teeth on the arête to skirt round their base on the W. flank of the mountain. Some troublesome bits of rock-work had to be accomplished before the party were able, by means of a very steep gully filled with loose rocks, to regain the N. arête of the peak, whence a few minutes along it brought them to its highest

* *Bollettino del C.A.I.* vol. ix. p. 363; vol. x. p. 354, *note*; vol. xi. p. 16.

† Published in vol. xii. of the *Alpine Journal*, p. 493. For the various usages of the name Grande Serre see *ibid.* vol. xi. pp. 480–1.

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point (1½ hrs. from the point where the ridge was first left). Throughout the ascent the rocks were detestably rotten and treacherous. The view was very quaint, as the peak rises between two unnamed glaciers, and almost at the foot of the great snowy N. arête of the Grivola. A much easier way was discovered on the descent, though it is far from being the most obvious one from below. Descending along the perfectly easy S. ridge for a very short distance, the party struck obliquely from right to left down the lower part of the great rocky W. face of the peak, far below the teeth which had given so much trouble in the morning. In this way, without any difficulty at all, a point slightly below the level of the Col de Trajo was reached in 55 minutes from the top of the peak. The track of the col was soon rejoined by means of débris, and the beautifully situated huts of Gran Nomenon in 35 minutes more. A very rapid descent down a very picturesque glen led to the hamlet of Vièyes (1 hr. 25 min.), on the usual track from Cogne to Aymavilles, and Aosta was reached the same night.

Grand Roc Noir (3,537 mètres = 11,605 feet); Pointe de Vallonet (3,566 mètres = 11,700 feet). *August* 27.—Mr. Coolidge, with young Christian Almer, starting from Lanslebourg, followed the usual road to Bessans as far as the hamlet of Champs (20 min.), whence, mounting due N. in a nearly direct line, they gained the ridge, separating two lateral valleys, of which the highest point is marked 3,133 mètres on the French map, and then proceeded along it and the S.E. arête of the Grand Roc Noir to the very base of the final pyramid. Climbing directly up the rocky S.E. face to the base of the last red rocks, they bore round to the E. foot of the peak (5 hrs. 20 min. from Champs), the summit of which was attained in 15 minutes more by rather steep though not difficult rocks, then iced and very cold. Returning to the E. foot of the peak in 15 minutes, a traverse along a snowy crest to the E., followed by a short descent to the N., brought them to the S. foot of the Pointe de Vallonet, which was easily climbed by a snow slope and broken rocks in 25 minutes. Returning by the same route to the E. foot of the Roc Noir (15 min.), they descended by a snowy gully to the little glacier lying to the S.E. of the peak, quitted it on the left bank (in 25 min. from the E. foot of the Roc Noir), descended a great quantity of moraine, and bore round to the E. by a sheep track above steep rock precipices which led them to the upper pastures, the Chalets de la Fesse being reached in 1 hour from the glacier. Passing along these pastures, and close to the chapel of St. Antony, they descended by a rough path to the hamlet of La Magdeleine (1 hr.), at the summit of the low pass between Lanslebourg and Bessans, whence Bessans was reached in 1 hour more, the entire journey from Lanslebourg to Bessans having taken 12½ hours, including halts.

On August 9, 1880, M. Edouard Rochat took the two peaks on his way from one village to another, but, having followed a more circuitous route (rather farther to the E.) than the party of 1889, he employed no less than 18 hours (including halts) in effecting the expedition.* He found a large cairn on the Roc Noir, built by the

* *Annuaire du Club Alpin Francais*, 1880, pp. 109-12.

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French engineers (probably in 1864, when the district was resurveyed), in which there was, in 1889, besides his card, an undated one of M. Edmond Esselin, sub-lieutenant in the 13th Chasseurs. No traces of any ascent since M. Rochat's were found on the Vallonet; a small cairn alone indicated that it had been previously visited. The party of 1889 were of opinion that the Roc Noir was slightly the higher of the two peaks, and that there was some mistake in the figures attributed to each on the map. In any case the peaks are the highest in the extensive district between the Col de la Leisse, the Levanna, and the Tsanteleina (Ste. Hélène).

Pelaou Blanc (3,136 mètres = 10,289 feet); Pointe des Lessières (3,087 mètres = 10,128 feet). *August* 28.—The last-named party, starting from Bessans, followed the Iseran path past Bonneval as far as the new bridge a little way beyond the old Pont de la Neige (3 hrs. 25 min.), then struck up to the S.W. over grass and débris, reached (½ hr.) the glacier between the Pelaou Blanc and the Ouille de la Jave (2,885 mètres), traversed it in a S.W. direction as far as a rock spur (overlooking another small glacier at the lower end of which there is a fine glacier lake), and then mounted direct over débris and rocks to the Col des Fours (2,987 mètres; 1 hr. 5 min.). Thence in ½ hr. the summit of the Pelaou, the highest summit in the spur extending N. from the Méanmartin peaks to the upper valley of the Isère, was climbed by the broken rocks of its S. arête. A cairn of unknown origin was found on the peak, the view from which was of great beauty and of the utmost topographical interest. The white rocks of which the peak is composed, and to which it owes its name, are in striking contrast with the darker ones which make up the neighbouring ridges. Descending by the N. ridge of the peak to the Col de l'Arselle (3,053 mètres, 10 min.), the party remounted along the rocky ridge to the N. to a peak not marked on the map, but certainly exceeding in height that of 3,087 mètres further to the N. (15 min.). Descending in 20 min. by its N. ridge to an easy but hitherto unnoticed pass (which leads from the Calabourdane glen to the Iseran path, like the Cols des Fours and de l'Arselle, and has on its W. side a fine crevassed glacier not shown on the map, and on the E. side a small glacier which is therein indicated) they once more remounted a rocky ridge to the peak marked 3,087 mètres (20 min.), the position of which is accurately given on the map, at least with regard to the large Lac de l'Ouglietta. Descending a few steps down the W. ridge of this peak, a glissade down the snow field named Glacier des Lessières on the map took them to the pastures (15 min.), whence bearing nearly due N. they struck a path which led them past two chalets and through a gorge between the Calabourdane and Iseran glens, by which the old Iseran track was rejoined near the hamlet of Laissenant, a short distance above La Val, in the upper Isère valley, the latter village being reached in 1 hr. 20 min. from the glacier.

This 'Gratwanderung' from the Col des Fours to the peak 3,087 mètres, though lying over summits of but moderate height, commanded a series of the most superb views on every side; but the ridge is very imperfectly represented on the French map, and

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even on the excellent map of the Southern Graians, published by Mr. R. C. Nichols in vol. iii. of the 'Alpine Journal,' for an important peak and glacier are in both simply passed over without notice. The old Sardinian map is even more defective, save in the delineation of the lower gorge. The French and Sardinian maps and Mr. Nichols give the name of Pointe des Lessières to a point marked 2,880 mètres, close to the Iseran, but it seems to belong more properly to the peak 3,087, which might, however (in case such a transference of names be considered inconvenient), be called 'Pointe de l'Ouglietta,' from the lake not far from its N.W. foot. It may be added that the Col des Fours here mentioned is the Col des Fons of Mr. Nichols' map; and that the peak of 3,100 mètres, marked on the French map to the north of that of 3,087, is distinctly lower than this last.

Pointe de Bazel (3,443 mètres = 11,296 feet, French map), or Punta Calabre (3,446 mètres = 11,306 feet, New Italian Survey); Cime de Quart Dessus (3,474 mètres = 11,398 feet, both maps); Col de la Tsanteleina (3,167 mètres = 10,391 feet, New Italian Survey). *August* 29.—The last-named party, starting from La Val, in the upper Isère valley, reached (3¾ hrs.), by the usual route, the true Col de Rhèmes (3,062 mètres, French map; 3,101 mètres, Italian map), and attacked the rocky E. face and ridge of the peak lying immediately to the W. of the col. The face, though steep, was broken and easy, so that they gained the highest rocks without any difficulty, and thence walked a short distance along the snowy N. ridge to the summit (gained in 1 hr. 15 min. from the col), a huge rounded snow-dome, descending in gentle snow-slopes on the N.W. side, and with a lower rocky point to the S., on which the cairn was built. This is believed to be the first ascent of the peak; for though in Signor Vaccarone's list of first ascents * the peak is stated to have been scaled (while the New Italian Survey was being made) on August 7, 1881, by Signor E. Troya, with two corporals of the 19th battalion of Alpine troops,† the absence of any cairn on the summit—despite numerous stones—shows that this peak was not climbed by the Italian party. There appears to be no other allusion in Alpine literature to any ascent of the point, and hence the 1889 party feel justified in claiming to have been the first on it. They propose to call the summit 'Pointe de Bazel,' in accordance with

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* *Bollettino del Club Alpino Italiano*, 1886, 'Alpi Graie,' No. 193.

† In a letter addressed to Signor Vaccarone, Signor Troya states that he ascended the Pointe de Calabre from the Col de Rhèmes, 'sempre per cresta dal lato est,' taking 1½ hrs. from the col to the peak, and building thereon a cairn 50 centimètres (or 20 inches) in height. These details are so vague as to the precise peak climbed that, in the total absence of a cairn in 1889, it may remain doubtful whether Signor Troya climbed this peak or that to the E. of the col. That he really went up the latter is rendered probable by the facts (1) that after his return to the col by the same route he crossed the glacier to the N. to the foot of the Granta Parei, whereas from the summit of the Pointe de Bazel unbroken easy snow-slopes stretch down to the glacier, so that the return to the col would have been unnecessary; (2) that until the publication of the new Italian map (surveyed in 1881) the name Pointe de Calabre was always given to the peak rising to the E. of the Col de Rhèmes (see below, pp. 491–2). W. A. B. C.

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the local usage at La Val, though the name is misapplied on the French map to the Tsanteleina (see M. Henri Ferrand's article in the 'Annuaire du Club Alpin Français,' 1888, pp. 92–3). Descending in 5 minutes by easy snow-slopes from the Pointe de Bazel to a depression to the N. (marked 3,355 mètres on the Italian map), they remounted, by the rocky S. rim of its E. arête, the beautiful snow peak marked 3,474 mètres, which is, apparently, included by the French map in the general name 'La Grande Parei,' which belongs properly to a well-known peak in Italy, just N. of the Tsanteleina or Ste. Hélène. The ascent, which was perfectly easy, took 25 minutes from the depression, and the party, exercising the privilege of the first party on the top, christened it 'Cime de Quart Dessus,' from the local name of the small glacier on its W. flank. Beyond this peak there is a slight depression (3,436 mètres of the Italian map), and then comes a bold rocky ridge (rather higher than 3,474), which is really but a part of the arête running up to the Tsanteleina, and is not specially marked on any of the maps. It is from the Cime de Quart Dessus that the great spur dividing the Quart Dessus Glacier from the Bazel Glacier to the S. takes its origin, and this peak may, therefore, claim an independent existence.

Returning to 3,355 in 15 minutes by way of the beautiful snowy E. ridge of the Cime de Quart Dessus, the party then struck to the N. across the nearly level snows of the uppermost part of the great Rhèmes Glacier (called 'Ghiacciaio dei Socce' by the New Italian Survey), and in 30 minutes gained the broad snowy opening (3,167 mètres of the Italian map) between the Tsanteleina (3,606 mètres) to the S. and the Granta Parei (3,473 mètres; inaccurately written Grand Apparei) to the N. It was named the 'Col de la Tsanteleina,' for this is believed to be the first occasion on which it has been crossed as a col. (It was first reached, minus the last few steps, from the French side, on August 5, 1878, by Mr. Coolidge and the Almers, on the occasion of the first ascent of the Tsanteleina from the N., and has since been attained, by one or the other side, by several Italian and French climbers, both sides not having, apparently, been traversed by the same party till August 29, 1889.) Descending by a broad and easy glacier towards the main glacier coming down from the Col de la Goletta (or Gailletta), the party bore round to the W., quitted (20 min.) the main glacier on its *left* bank (the usual route from the Col de la Goletta leaves the ice on the right bank), and then traversing moraine (in part below a hanging glacier), rocks, and grass, remounted (1 hr.) to the beautiful, though well-hidden, Lac du Santet, whence in 25 minutes more they gained the Col de la Bailletta (2,855 mètres), from which a rough track led them down in 1 hr. 5 min. to Fornet, and to La Val (½ hr.). Thus the party had made the complete circuit of the still little known peak of the Tsanteleina, though they were absent from La Val only 13 hrs. 10 min., from which 3 hrs. 35 min. must be deducted for halts, leaving 9 hrs. 35 min. actual walking. The views throughout the day were most superb, the weather being perfect. Both peaks can be admirably seen by a few minutes' walk from La Val, whether to the S. or E. It is to be noted that the New Italian Survey is far more accurate in these parts than the French map.

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Col de Bassagne (3,160 mètres = 10,371 feet, Puiseux; about 3,130 mètres = 10,270 feet, Coolidge); Pointe de Calabre (3,363 mètres = 11,034 feet, French map), or Roc del Fonte (3,276 mètres = 10,749 feet, New Italian Survey); Col de Calabre (3,081 mètres = 10,109 feet, New Italian Survey; 3,115 mètres = 10,220 feet, Puiseux). *August* 31.—The last-named party, starting from La Val, followed the usual route of the Col de la Galise (Galese) as far as the entrance of the little glen named 'Le Niclet' on the French map (1 hr. 55 min.). Mounting along the path on the right bank of the stream flowing through this glen to the moraine at the foot of the Bassagne and Galise Glaciers (35 min.), they ascended by that of the Bassagne Glacier to the base of that glacier (25 min.). Climbing up its right bank and round a conspicuous yellow knob of rock, they took to the glacier itself (½ hr.) just above the ice-fall, whence ½ hr. more over the easy glacier and snow slopes led to a mound of débris rising between the double snowy depression of the Col de Bassagne. The ascent to the col was perfectly easy, though there was no snow on the lower portion of the glacier, and might also be made by the rocks on the left bank, or straight up the glacier by means of a moderate amount of step-cutting. The descent on the Rhèmes side was made direct from the mound above mentioned, down a glacier with a number of crevasses, so that bearing gradually to the left the party gained in 35 min. from the col the moraine (at the N. base of the Rocca Basagne) separating that glacier from the glacier coming down from the Col de Calabre more to the west. This is the first complete passage of the Col de Bassagne, for though MM. Puiseux and Boutan on August 17, 1877,* reached it from the Rhèmes side, they found it impossible to force their way down on the French side, and had to gain the Isère valley by traversing round to the Col de Calabre, the first passage of which MM. Puiseux and Maingot had made on August 21, 1876.†

Mr. Coolidge and his guide then traversed round the N. base of the Rocca Basagne (3,224 mètres, Italian map, or 3,232 mètres, French map), but having gained the slopes just below the Col de Calabre (½ hr.), found that from that direction it was impossible to climb the peak between that col and the Col de Rhèmes, so descending to the lowest point of the glacier coming from the Col de Calabre (10 min.) they traversed it below (to the N. of) the wished-for peak, and ascending a steep slope of stones gained the right bank of the great glacier (Ghiacciaio di Centelina of the Italian map) which extends along a great shelf under the precipices of the Granta Parei, and above the main Glaciers de Rhèmes (25 min.). Thence by this glacier they gained the Col de Rhèmes (20 min.), whence crossing a bergschrund (5 min.) they climbed up the easy broken rocks of the N.W. ridge, the great snow slope on the W. face, and the rocks of the S. arête, of the peak, reaching its summit in 35 minutes from the bergschrund. A cairn was found there with a card stating that the first ascent of the peak had been made (also from the Col de Rhèmes) on

* *Annuaire du Club Alpin Français*, 1878, pp. 215–21.
† *Ibid.* 1876, pp. 198–200.

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August 13, 1888, by M. Dulong de Rosnay with Victor Mangard, of La Val, who had been obliged to cut no fewer than 200 steps on the snow slope.* The peak climbed on August 31, 1889, is called Pointe de Calabre (3,363 mètres = 11,034 feet) by the French map, and Roc del Fonte (3,276 mètres = 10,749 feet) by the Italian map. The former name is that by which it is most generally known, but the Italian height is probably the most correct, as the point is far lower than the Pointe de la Galise (3,342 mètres, French map; 3,345 mètres, Italian map), and is not so very much higher than the Rocca Basagne (3,224 mètres, Italian map, or 3,332 mètres, French map), though, on his card, M. Dulong de Rosnay attributes to it the exaggerated height of 3,385 mètres. From the summit (as from the Col de Rhèmes) the church of Notre Dame de Rhèmes is a conspicuous object. Returning to the W. foot of the peak in 13 minutes, the party then retraced their steps towards the Col de Calabre, the summit of which was attained in just over 1 hour from the W. foot of the peak, or 20 minutes from their morning's track across the glacier on its N. side. It seemed to them that either the Italian height of the col was much too low, or that of the Rocca Basagne (ascended on August 21, 1876, by MM. Puiseux's party in a few minutes from the Col de Calabre, and on September 8, 1889, by Signor Bobba by the N.E. face from the Col de Bassagne †) much too high, for the difference is not more than 200 feet. The height assigned to the col by MM. Puiseux seems far nearer the truth. Descending the easy glacier on the French side, the ice was quitted at the end of the glacier in 15 minutes from the col, and the track of the Col de Rhèmes rejoined (10 min.) at the base of the common moraine of the two glaciers, whence 1 hr. 40 min. sufficed to regain La Val by the ordinary route of the latter col. The party were absent from La Val 13 hrs., of which 9¾ hrs. were actual walking.

Thus in the course of their explorations on August 29 and 31 Mr. Coolidge and Almer crossed four of the passes leading from the Isère valley to the Rhèmes valley, viz. Cols de Rhèmes and de Calabre (old), Cols de Bassagne and de la Tsanteleina (new), having in 1878 and 1886 crossed the fifth, Col de la Goletta. In 1889 they also ascended three out of the four peaks on the ridge between these cols (Pointe de Bazel, Cime de Quart Dessus, Pointe de Calabre, but not the Rocca Basagne), having in 1878 ascended ‡ the Sassière and Petit Mont Bassac, which form the W. extremity, and in 1886 § crossed over the Pointe de la Galise at the E. end of the chain dividing the Rhèmes valley from France, so that this ridge is now thoroughly explored and accurately known.

It may be of use to state that the great glaciers known collectively as 'glaciers de Rhèmes' really form three well-marked groups—

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* *Annuaire du Club Alpin Français*, 1888, pp. 114–19. As pointed out above (p. 489, *note*), this *may* have been the peak ascended by Signor Troya on August 7, 1881. In 1888, M. Dulong de Rosnay took 1½ hrs. from the col to the top (*not* 2½ hrs., as printed in error in the *Annuaire*).

† *Rivista Mensile del C.A.I.* September 1889, p. 318.

‡ *Alpine Journal*, vol. ix. pp. 101–2. § *Ibid.* vol. xiii. pp. 119–20.

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1. *The upper shelf under the Tsanteleina and Granta Parei.* This is called on the Italian map by the double name of 'Ghiacciaio di Centelina' and 'G. dei Socce,' and over it lies the way from the Cols de Rhèmes, de la Tsanteleina, and de la Granta Parei.*

2. *The Glacier extending along the N. side of the Pointe and Col de Calabre*, down which comes the Col de Calabre route.

3. *The Glacier extending thence to the E. towards the Pointe de la Galise*, over which is the route from the Col de Bassagne and Pointe de la Galise.

2 and 3 are separated only by a moraine at the N. foot of the Rocca Basagne, and are grouped together by the Italian map under the common name of 'Ghiacciaio del Fonte.'

Pointe du Fond by the South Ridge (3,673 mètres = 12,051 feet, New Italian Survey; 3,653 mètres = 11,985 feet, French map); Pointe des Pattes des Chamois, or Punta dei Camosci (3,609 mètres = 11,841 feet, New Italian Survey; 3,632 mètres = 11,917 feet, French map); Becca di Suessa (3.421 mètres = 11,214 feet, New Italian Survey), or Aiguille du Glacier (3,412 mètres = 11,195 feet, French map). *September* 2.—The last-named party, starting from Tignes, followed the usual route up the Aiguille de la Sassière (by way of the Réviette chalets and the ridge between 'La Davie Signal' [3,162] and the point 3,278 mètres) to the base of the final snow-cone of that summit (4¼ hrs.), and then bore to the N.E. over the glacier to the well-marked depression between the Sassière and the peak 3,673 or 3,653 (20 min.), whence by the snowy S. arête and some easy shaly rocks the summit of the latter was gained (20 min.),† the view from it being exceedingly fine. Descending by the snowy N. arête to the Col du Fond (3,341 mètres, New Italian Survey) in 20 minutes, they followed the rocky ridge to the N. as far as a deep notch at the base of the peak 3,609 or 3,632 (20 min.), whence, skirting by their W. flank several rocky teeth, they regained the crest of the S. arête, and attained the summit of the peak (25 min. from base). The view obtained was again exceedingly fine. They then traversed a long and easy snow-ridge and snow-slopes, and mounting by its rocky S. arête, gained the top of the Becca di Suessa (50 min. from 3,609). Some glissades down the easy N. face of the peak and over the Suessa Glacier brought them to a glacier lake, and then to the N. edge of the glacier (20 min.), whence, traversing round the E. base of the point 3,116–3,122 mètres, and over stone slopes to avoid some high rocky precipices, they descended in 10 minutes till quite close to and on a level with the Col Vaudet (called Colle di Suessa or di Sarrou on the Italian, and Passage du Rocher Blanc on the French map). From this point a rough scramble down stones and débris led them in 15 minutes more to the valley descending from the col on the Italian side. Following the track from the col, they reached (1 hr. 55 min.)

* *Alpine Journal*, vol. ix. pp. 100, 481.

† A great cairn was found on this peak, as well as a long wooden funnel or case, on which were cut the names of three Val Grisanche men and the date '20/7/1880.' Both objects are most probably relics of the new survey of the Italian Alps, made in 1880–1.

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the hamlet of Fornet, at the head of the Val Grisanche, after a long but enjoyable traverse along a lofty ridge commanding superb views.

On July 22, 1876, the late M. Henri Cordier made the first passage of the Col du Fond (leading from the Vaudet chalets to Tignes), whence he made the first ascent of the peak 3,673 or 3,653 by its N. arête.* He called this peak Pointe de la Sassière, a name which, to avoid confusion with the loftier peak to the S., might well be changed to Pointe du Fond, from the magnificent glacier descending from both peaks on the W. flank. On August 17, 1889, Signor Giovanni Bobba, with Casimir Thérisod, of Notre Dame de Rhèmes, starting from the chalets of Soches, gained the summit of the Sassière by the E. arête from the Col de Bassac Déré, descended from it along its N. arête, traversed the Pointe du Fond, and made the first ascent of the peak 3,609–3,632, which he christened, descending thence to the Vaudet chalets by the Glacier des Pattes des Chamois on the N.E. side of the peak.† Signor Bobba's expedition was unknown to the party of September 2, until his cards were found on the Pointe du Fond and the Pointe des Pattes des Chamois. There was no trace of any previous ascent on the Becca di Suessa, so that the party of September 2 built a cairn there (on stones on the French side, just below the snowy summit) and consider themselves justified in claiming to have made the first ascent of this fine summit.

Grande Becca du Mont ou de l'Ano (Sardinian map), or Grande Becca du Mont (3,193 mètres = 10,476 feet, New Italian Survey), or Bec de l'Ane (3,218 mètres = 10,558 feet, French map). *September* 3.—The last-named party, on their way from Fornet, in Val Grisanche, to Sainte Foy by the Col de la Sachère or de la Sassière or du Lac (2¾ hours up, 3 hours down), ascended from the col in 55 minutes by the N. face (easy broken rocks and snow) this fine isolated peak, the culminating point of the frontier ridge between that col and the Col du Mont. A half-ruined cairn and the walls of a stone hut (both probably built by the surveyors for the New Italian Survey in 1880 or 1881) were found on the lower or E. peak overhanging the lake and oratory of San Grato, but there were no traces of any previous ascent on the slightly higher W. peak (a few minutes distant along an easy ridge) which dominates the Lac Noir on the French side. The view must be very fine when free from clouds, for the Ruitor is close at hand, backed by the Mont Blanc range, with the broad pasture basin of La Sassière de Sainte Foy as a foreground, while to the S. and W. the Grivola and Grand Paradis, the Sassière, the Tsanteleina, and the Invergnan come out very grandly.

Pic du Ribon (3,543 mètres = 11,625 feet). *September* 7.—The last-named party, having ascended the Roche Melon (11,605 feet) by the ordinary route from Bessans (5 hrs. 35 min. walking), returned to the foot of the final snow cone, and then traversed in a N.E. direction the great snow plateau on its N. side known as the Roche Melon, or Ribon

* *Annuaire du Club Alpin Francais*, 1876, pp. 160–2; *Bulletin du C.A.F.* 1876, p. 210; *Alpine Journal*, viii. 100–1.

† *Rivista Mensile del C.A.I.* September 1889, p. 318, and private information.

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Glacier. They thus gained the ridge overlooking the Glacier de Derrière le Clapier to the E., and following the easy broken rocks reached (1 hr. 20 min. from the summit of the Roche Melon) by its S. arête the peak marked 3.543 mètres on the French map. (It was first ascended on July 21, 1889, by Monsieur Henri Ferrand, who christened it 'Pic du Ribon,' and was again reached on August 8, 1889, by Count Luigi Cibrario and Signor Luigi Vaccarone, both parties having followed the S. ridge*). The view from the summit was very fine, and enabled one to understand thoroughly the intricate ranges lying between the summit and the Albaron.

The party then descended the Glacier de Derrière le Clapier by a new and easy route (the only one previously known being the very difficult Passo Castagneri, lying some distance S. of the peak †). Following the N. ridge of the Pic du Ribon till a little way above the hollow between it and a lower snow dome to the N. (marked 3,510 mètres on the French map), they then traversed the snow slopes on the E. of the ridge, crossed the great snow couloir descending immediately from the aforesaid hollow, gained the rocks on its left bank, and went straight down a narrower gully, then well filled with snow, to the glacier, which was reached in 35 minutes after quitting the summit of the Pic du Ribon. (To the N. of the snow dome is a broad depression—marked 3,361 mètres on the French map—which looks quite easy, and forms the natural communication between the Ribon and the Derrière le Clapier Glaciers.) Keeping rather to the left, the glacier was descended throughout its whole length, and quitted at its lowest end in 50 minutes more, the Col de l'Autaret path being joined immediately after on the right bank of the stream. By this path, which passes through the wild Vallon de la Lombarde and by the hamlet of Avérole (the highest in the Alps), Bessans was regained in 3 hrs. 10 min. from the glacier, after a long but most interesting expedition.

Col de Saint Grat (circa 3,350 mètres=10,981 feet). *September* 4, 1886.—Mr. Coolidge and young Christian Almer ascended from the Val Grisanche to the great Ruitor glacier by a route which at the time was not believed to present any novelty (being obvious, direct, and easy), but of which no record seems yet to have appeared in print, so that it is now noticed in the hope of eliciting further information.

Starting from Fornet, at the head of the Val Grisanche, they followed the Col du Mont track for some time, and then the path, which bears to the N. round the hill-side on the left and later on the right bank of the tributary stream, to the glacier lake and oratory of San Grato (1 hr. 50 min.). Steering to the left round the lake, they ascended due N. through a rocky glen and up two rock steps or terraces at its head (35 minutes). Traversing to the left over a small glacier in 15 minutes, they mounted by stones to the left-hand extremity of a long snow band (35 minutes), whence in 50 minutes, by rocks and snow, they gained the S. edge of the great Ruitor Glacier, the crest of which, between the Ruitor and the Becca du Lac (not far from

* *Rivista Mensile del C.A.I.* August 1889, p. 254.
† See *Bollettino del C.A.I.* 1883, pp. 264–75.

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the E. foot of the latter point), was gained in 2 hrs. 15 min. (slow walking) from the lake.* The glacier was then crossed to the N.E., and the usual route joined at the N. foot of the highest point of the Ruitor, the summit being gained in 45 minutes from the pass, which may be fitly named 'Col de Saint Grat.' The descent was made (in 4 hrs. 40 min. walking) to La Thuile, on the Little St. Bernard road, by the chalets of Ste. Marguerite, and the Lac du Ruitor, now sadly shrunken and desolate-looking.

Bessanese by the Northern Arête (3,632 mètres=11,917 feet, Italian map), or Les Grandes Pareis (3,617 mètres=10,867 feet, French map). *September* 2.—Signor Guido Rey, with Antonio Castagneri, of Balme, starting from the Crot del Ciaussiné club hut (Rifugio Gastaldi), reached, in 1½ hours, the Colle della Bessanese, just north of the peak. Then, climbing over the W. wall to a notch in the N. arête, about 50 mètres higher than the col, they followed the N. arête straight up to the N. point (apparently not before climbed) in 4½ hours' walking from the col, and in 15 minutes more gained the highest summit. The descent was made to the Col d'Arnas.†

Mont Blanc District.

Dôme de Rochefort from the Italian side (3,997 mètres=13,114 feet). *September* 14.—Mr. William Muir, with Emile Rey and David Proment, starting from the Grandes Jorasses Club hut at 6.20 A.M., followed the usual Grandes Jorasses route for about 15 minutes, and then crossed the glacier above the ice-fall. Passing the bergschrund at 7.30 A.M. at a point considerably south of the extremity of the conspicuous snow-couloir seen from the hut on the eastern face of the peak, they climbed up the rocks of the S. arête. Following this arête till it joined the main mass of the mountain by a short saddleback of snow, they then crossed, at its narrowest point, a snow-couloir which cuts off this arête from the upper part of the mountain, and got on to another arête—virtually a continuation of the former one—and followed it till it too was cut by the great snow-couloir on the E. face. Traversing to the west, and climbing up a rather difficult chimney, the party gained at a point just north of a small gendarme the final arête of tolerably firm rock, by which (in 50 min) the summit of the peak was gained at 11.35 A.M. Leaving the top at 12, the party descended the chimney by the aid of a second rope, recrossed the bergschrund at 4.45, and reached the hut at 5.25. Halts, 35 min. up, 55 min. down—in all 1½ hrs. The rocks on the peak are loose and rotten, so that its ascent is only to be recommended after a long spell of fine weather. The mountain was first climbed by Mr. J. Eccles, on August 12, 1881, from the French side by way of the Leschaux Glacier.‡

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* It was the lofty cliff of snow in which the Ruitor Glacier ends on the S. side that deterred Mr. Mathews' party in 1861 from descending, by the route described above, to the Lac de S. Grat and the Col du Mont track. (See *Peaks, Passes, and Glaciers*, 2nd series, ii. 388.)

† *Rivista Mensile del C.A.I.* September 1889, p. 317.

‡ *Alpine Journal*, vol. x. p. 405.

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Aiguille de l'Allée Blanche (3,474 mètres = 11,398 feet, Viollet le Duc; 3,709 mètres = 12,169 feet, Mieulet) or Aiguille de la Scie (3,694 mètres = 12,120 feet, New Italian Survey). Col de l'Allée Blanche. *July* 25.—MM. Attinger and L. Kurz, with J. Croz and Jos. Simon, starting at 6.10 A.M. from a bivouac on the right bank of the Trélatête Glacier, about 2½ hours beyond the Pavillon, mounted that glacier to the foot of the Aiguille de l'Allée Blanche (7.30 A.M.), and thence climbed up by a steep but not difficult slope to the col which lies immediately to the N. of the peak, and was gained at 11.30 A.M. Leaving the pass at noon, the party ascended the Aiguille de l'Allée Blanche in 2½ hours, along a very narrow snow-ridge on which steps had to be cut continuously. The return to the pass took 45 minutes, and the party easily descended to the Glacier de l'Allée Blanche, but having been entangled in the séracs on its left side, were forced to pass the night on the slopes of the Mont Suc.

The Col de l'Allée Blanche is rather higher than Messrs. C. E. and G. S. Mathews's Col de Trélatête,* of which it is a variation, pointed out by Mr. George.† The col and the pass can be well seen on the diagram given in the 'Alpine Journal,' vol. ii. p. 290.

Grande Luis (about 3,500 mètres = 11,484 feet). *June* 3.—MM. Attinger, Colomb, and Kurz, with J. Bessart, F. Biselx, and a porter, starting from the Cabane d'Orny at 1.30 A.M., crossed the Fenêtre de Saleinaz and the upper part of the Glacier de Saleinaz to within a short distance of the foot of the Col de la Neuva. Turning to the left, the party proceeded in the direction of the N.W. arête of the Grande Luis, which was gained about one-third of the way up, just where is a little snowy saddle. The summit was attained at 8.10 A.M. by following the arête. The party descended to the La Neuva Glacier by loose rocks and a snow slope, and then turning to the left, joined the route of the Col de la Grande Luis at the foot of the couloir, following which they reached the La Neuva chalets in the Val Ferrex at 12.30. The peak rises N.E. of the Tour Noir, and on the ridge between the Saleinaz and La Neuva glaciers, and is indicated by name, but without height, on the Siegfried map.

Col de la Grande Luis (3,440 mètres = 11,286 feet). *August* 20, 1888.—MM. Barbey and Kurz, with J. Bessart and Jos. Simon, starting from the Pavillon de l'Ognan, traversed the Col du Chardonnet (4½ hours), and crossing a secondary glacier to the S. of the Saleinaz Glacier gained (3.10) this col, which is the depression between the Grande Luis to the W. and the Darreï (3,537 mètres, on the Siegfried map) to the E. Descending by the rocks on the right bank of the snow couloir (exposed to stones from the Darreï), which falls from this col towards the Glacier de la Neuva, they gained this glacier, and without any difficulty by the left bank of the glacier and *gazon* reached the La Neuva chalets in the Val Ferrex in 3½ hours from the pass.

This col is parallel to the Col de la Neuva (3,420 mètres), which lies between the Grande Luis and the Aiguille de la Neuva (3,750

* *Alpine Journal*, vol. ii. 285, 288-292.

† *Ibid.* vol. ii. p. 400.

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mètres), and which was first crossed on September 21, 1876, by Monsieur A. Guyard, with Henri Dévoussoud and Auguste Cupelin.*

Arolla District.

Aiguille de la Za from the West (3,662 mètres=12,015 feet). *July* 26.—Miss Richardson, with Emile Rey and J. B. Bich, ascended the buttress directly facing Arolla, keeping mainly to the right as far as the base of the final pinnacle. Turning to the left, they reached the W. face by a crack of a deep orange tinge across a smooth wall of rock. After ascending about 70 feet they were obliged to turn to the right and proceed close under the W. arête by ledges and cracks across smooth rocks until within a few feet of the summit, when the crest of the W. arête was gained. Attempts, rendered ineffectual by loose rocks, were made to keep entirely on the arête. The party descended by the usual route.

Pigne d'Arolla from the N.E. (3,801 mètres = 12,471 feet). *August* 2.—The same party followed the usual route for a short distance on the Glacier de Pièce; then, passing below the icefall descending from the face of the mountain, reached a prominent rocky buttress. The rocks, generally smooth and covered with débris and fresh snow, were climbed for 1 hr. 15 min., and then left for very steep snow-slopes, which led, in 1 hr. 5 min, to a point on the E. arête, 30 min. from the summit. Times exclusive of halts.

Pigne d'Arolla by the Northern Face (3,801 mètres=12,471 feet). *August* 5.—Mr. Alfred G. Topham, with Jean Maître, left Arolla at 2 A.M., and reached the bottom of a large snow couloir on the west side of the Pièce Glacier. Ascending this partly by the shaly rocks on its sides, the top of the long rock arête dividing the Cijorénove Glacier from the Pièce was reached at 4.50 A.M. Hence the route lay up a sharp snow and rock arête, which suddenly turns to the right in a long curve extending to the foot of the actual face (6.40 A.M.). The height from this point to the top was found by aneroid to be 1,300 feet, and is exceedingly steep, the lower portion (after the schrund is passed) being the worst, and composed of blue ice with a very thin coating of snow. The patches of rock to the left were useless, owing to excessive rottenness. The ascent of the face was made 'à quatre pattes,' the steepness allowing of no upright standing. The top was reached at 10.15 A.M. In descending the E. arête was followed, and the hôtel regained at 3 P.M. (A few days later Miss C. M. Gardner descended from the Pigne by this new route.)

Dents des Bouquetins by West Face and South Arête (3,848 mètres = 12,625 feet). *August* 10.—Mr. Topham's party, with Pierre Maître, left Arolla at 2 A.M. From the upper Arolla Glacier they made for a large couloir which lies between the highest peak and the southern peak (3,690 mètres), and therefore a good bit to the north of the spur marked 3,097 mètres on the Siegfried map. After crossing a nasty

* See *Annuaire du Club Alpin Français*, 1876, 230–5. For the general topography consult *Alpine Journal*, vol. xiv. 405–6, the sketch map in the *Echo des Alpes*, 1888, p. 263, and the outline sketch, *ibid.* 1889, p. 189.

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bergschrund (5.45 A.M.) the ascent of the couloir was found to be impossible, owing to ice, so the rocks to the north had to be taken to, and a way found up them. The whole of this face of the Bouquetins is composed of perpendicular rocks and plaques, covered, wherever anything will lie, with débris of large and small stones and dust. In two or three places it was possible to see clean through the buttresses. Twice the party were reluctantly compelled to strike far on to the dangerous face by reason of the perpendicular walls near the couloir. The ridge of the arête above the couloir (on a level with the southern peak) was reached at 8.45 A.M. From here, looking along the south arête, any attempt on the southern peak from this side seemed impossible, the arête being composed of knife-edged needles, mostly overhanging to the east, but the route might be done in the reverse direction. The point reached was cut off from the needles by the perpendicular wall of the couloir. The route from here lay up the south arête, which is composed of gendarme upon gendarme, the last one being the most awkward; but the rocks were found quite different from those on the face. The summit was reached at 11.30 A.M. The descent had to be made entirely down the north arête as far as the col, owing to the east face being impassable from ice-covered rocks. The hôtel was regained at 7 P.M. Anyone again attempting the west face of the Bouquetins must make an earlier start, as it is swept with stone avalanches, even in the early morning.

Monte Rosa District.

DENT BLANCHE BY THE S.E. FACE AND N.E. ARÊTE (4,364 mètres= 14,318 feet). *September* 2.—Mr. O. Eckenstein, with Matthias Zurbrücken, accomplished the ascent of this peak by a route which is believed to be the worst yet taken. Starting from Zermatt at 12.30 P.M. on September 1, they returned at 4 A.M. on September 3, not having slept out, but having gone straight through.

From the plateau of the Schönbühl glacier they climbed up rocks to the small hanging glacier on the S.E. face of the peak (6 hrs. 15 min.), and mounted it to the upper rocks (2 hrs. 5 min.). Climbing by these rocks nearly straight up to a short distance from the crest of the N.E. arête, they struck to the left across some snow couloirs, and then gained the crest of that ridge (3 hours). The N.E. arête was followed to the summit (4 hrs. 10 min.). The snow and ice were in very bad condition.

It will be observed that this route does not touch at any point the line of ascent from the Schönbühl glacier taken on August 21, 1874, by Mr. Whitwell, his route lying up the rocks of the S.E. face to the W. of the hanging glacier.* It joins on the N.E. arête the route followed on August 11, 1882, by Messrs. J. Stafford Anderson and G. P. Baker.†

DENT D'HÉRENS BY THE S.E. AND E. ARÊTES (4,180 mètres=13,715 feet, Siegfried map; 4,175 mètres = 13,698 feet, New Italian Survey).

* *Alpine Journal*, vol. vii. pp. 107, 427–431.
† *Ibid.* vol. xi. pp. 119, 158–172.

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July 19 and *August* 31.—Mr. H. W. Topham succeeded in making this new route up the Dent d'Hérens. Starting on July 19 from Breil, with Aloys Supersax and Clemenz Furrer, he mounted to the foot of the Glacier du Mont Tabor (Ghiacciaio del M. Tabel of the Italian map, Glacier d'Erin of Reilly's), and, immediately under the ice wall, which is continually sending down fragments, took to the rocks of the ridge bounding the glacier to the E., or the S.E. ridge of the peak. In 20 minutes, by a comparatively easy slope, the party gained the crest of that arête, when they roped and began a climb, which, up to the snow-fields above, was steep and difficult. After surmounting or turning several 'gendarmes,' they traversed to the right for several hundred feet, parts of this traverse being particularly awkward. Then, by a rock gully, they regained the crest of the arête, 4½ hours from their starting point 1,500 feet below. Crossing some snow, they again took to the rocks, leading up to the cup-like snowfields which lie at the very base of the peak itself, but from this point the party were forced by bad weather to return to Breil by the upper rocks of the S.E. arête and the M. Tabel glacier.

On August 31, Mr. Topham and Supersax, with Pollinger in lieu of Furrer, completed the ascent by this new route. Having gained the cup-like snowfields from the Stockje, they descended them to the point at which the party had been driven back on July 19. Reascending the arête back to these snowfields, they crossed them and climbed up to the summit by the E. arête, which descends towards the Matterhorn, gaining the top in about 3 hours from the highest point attained on July 19.

Gross Hohwänghorn (3,678 mètres = 12,068 feet). *August* 30.—Messrs. Ellis Carr and F. O. Schuster, with Josef Moser and Peter Baumann as guides, ascended this peak, which is well seen from the lower part of the Zmutt glacier on its left bank and from the Arben glacier, and which rises between the Hohwänghorn and Mont Durand, the sight of which it completely hides from the above-named points of view. Starting from Zermatt at 4.10 A.M., they ascended to the higher plateau of the Arben glacier, and finding the rocks on the E. face of the mountain apparently impracticable, went up to the snow col between it and the Hohwänghorn, connecting the Arben with the Hohwäng glaciers. Ascending the latter for a few minutes in a N. direction and then facing E. and crossing a bergschrund, they climbed up to the S. ridge of the mountain by steep and very loose rocks, and by an easy snow arête gained the summit at 12.30.

The view from here, especially of the Dent Blanche, Matterhorn, and Gabelhorn, is interesting and most magnificent. The party descended by the Hohwäng glacier and the Ebilücke, between the Hohwänghorn and Ebihorn.

On the summit it was discovered that the mountain had been ascended five years before by Dr. Emil Burckhardt, of Basel, who has kindly informed Mr. Schuster that his ascent was effected by the route which the latter's party followed in descending. Dr. Burckhardt has so far not published an account of his ascent, and he suggests the name 'Gross Hohwänghorn' for the peak. The expedition can be recommended as a short and thoroughly enjoyable one.

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ALPHUBEL BY THE WESTERN ARÊTE (4,207 mètres=13,803 feet).—Mr. George Broke, with Adolf and Xavier Andenmatten, starting from the new little inn at the Täsch Alp, followed the Mischabeljoch route for half an hour; then, bearing to the right, over steep grass slopes and boulders, reached the S. end of the moraine of the Weingarten Glacier (1 hr.). Mounting by snow-beds between the W. arête of the peak and the glacier, they gained this arête (¾ hr.) some distance below the shoulder which marks the junction of the two ridges enclosing the hollow called 'Thäli' on the Siegfried map. The shoulder was gained by fairly easy rocks (1 hr.), and then a broad snow-arête led the party to the base of the final peak (45 min.). To turn certain broad slabs of rock overlapping the wrong way they made use of a gully on the right, and then continued along the arête, gaining the S. arête just before the summit of the peak (1 hr. 55 min.), the difficulties gradually decreasing. Mr. Powell's route of 1879 * lies rather farther to the north, up the face of the W. arête.

KEHRENRÜCK BY THE WEST AND NORTHERN ARÊTES (3,345 mètres = 10,960 feet, Siegfried map; 3,352 mètres = 10,998 feet, Italian map). PEAK MARKED 3,373 MÈTRES (= 11,067 FEET) on the Siegfried map. BÖRTERRÜCK (about 3,425 mètres = 11,247 feet). AUGSTKUMMEN HORN (3,454 mètres = 11,333 feet, Siegfried map; 3,441 mètres = 11,290 feet, Italian map). *August* 26.—Miss Capel and Messrs. F. Baker-Gabb and W. H. Cozens-Hardy, with a porter, starting from Saas Fee at 2.15 A.M., mounted the Furggthal for an hour beyond the highest huts. Then crossing the slopes under the Börter Glacier, they struck the arête called Kehrenrück halfway up, and, following it, gained its highest point (3,345 mètres) at 9.5 A.M. No traces of any previous ascent were found, so a cairn was built. Leaving at 11 A.M., they followed the frontier ridge between Switzerland and Italy to the point marked 3,373 mètres, which was gained at 12.40 P.M. Between the points marked 3,345 and 3,373 the rocks were very interesting. A steep knife-edge of smooth rock led down to the notch (reached at 1.25 P.M.) south of the highest point of the Börterrück, over which summit some rotten rocks and an easy snow arête led to the foot of the Augstkummen Horn, the summit of which was gained at 3 P.M. Again no traces of any former party were found, and a cairn was built. Leaving the top at 3.15, easy snow-slopes led down to the Augstkummen Glacier, by way of which the return was effected to Saas Fee at 7 P.M.

PEAK MARKED 3,219 MÈTRES (= 10,561 feet) on the Siegfried map. *August* 30.—Signor F. de Filippi and Mr. W. H. Cozens-Hardy, with a porter, left Saas Fee at 1.10, reached the Antrona Pass at 6.40, and the summit of the Latelhorn (Punta di Saas of the Italian map) at 8.10 A.M. Starting at 8.55, they followed the ridge to the N., and gained, at 10.15, the top of the couloir S. of the peak 3,219, which the party of August 26 had gained on August 23, being driven back thence by bad weather. After unsuccessfully attempting to ascend the peak by its S. arête, they were forced to descend into the couloir on

* *Alpine Journal*, vol. ix. p. 367.

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the Saas side for a short distance in order to turn the smooth overhanging rocks of the arête, and thus reached the summit at 1 P.M. Having built a cairn, they descended by snow and stone slopes to the Furggthal, and reached Saas Fee at 6.15 P.M.

PIZZO DEL SAAS (3,246 mètres = 10,650 feet; Siegfried map) OR PEAK MARKED 3,223 mètres (= 10,575 feet) on the Italian map. KEHRENRÜCK BY THE S. ARÊTE (3,345–3,352 mètres, as above). *September* 2.—Mr. W. H. Cozens-Hardy with a porter left Saas Fee at 2.10 A.M., and followed the Furggthal nearly to the terminal moraine of the Furggen Glacier. They then ascended the steep slopes to the E., and reached a notch N. of the peak 3,219 (Siegfried map), at 7.40 A.M. Following the arête to the N. they gained the highest tooth of the Pizzo del Saas at 8.45 A.M. Leaving this point at 9.10 A.M. they continued northwards along the arête, crossing over the jagged rock teeth—affording little foot or hand hold—of which it is composed, and attained a small notch N. of the Pizzo at 10.5 A.M., the point marked 3,212 mètres (=10,539 feet) on the Siegfried map at 10.35 A.M., and by means of a wide perpendicular crack between two walls of rock on its S. face the summit of the Kehrenrück at 11.15 A.M. Leaving at 12.45 P.M., and descending by steep slopes of snow and loose stones into the Furggthal, they returned to Saas Fee at 3.55 P.M.

FROM THE LATELHORN TO THE SONNIGHORN. *September* 14.

Mr. W. H. Cozens-Hardy with Aloÿs and Albert Supersaxo, who had wished to accompany him as porters, started at 3.15 A.M. from a chalet at the entrance of the Furggthal, and mounted to the Antrona Pass. Thence following the routes described in the three previously mentioned expeditions, they reached the Latelhorn at 6.25; left at 7.5, reached at 7.25 the couloir at the S. foot of peak marked 3,219, and the peak itself at 7.50, the Pizzo del Saas at 8.15, and the Kehrenrück at 9.55. Starting thence at 11.40 they gained the Augstkummen Horn at 1.25 P.M. After a halt of 40 minutes the party attained the base of the S. foot of the Sonnighorn at 2.15, and the summit of the peak at 2.30. Thence they descended to the Mittel Pass (reached at 3.15), crossed the Rothblatt Glacier to the Almageller Alp, and returned to Saas Fee at 6.30 P.M.

This arête, and the peaks rising on it, afford some very interesting and varied climbing. The rocks are generally good, and in some places by no means easy. The arête is in parts no more than a knife-edge of rock, while the views of the mountains on both sides and of the Italian lakes are most magnificent.

SPÄHNHORN (3,194 mètres = 10,480 feet, Siegfried map) OR PIZZO D'ANTIGINE (3,190 mètres = 10,466 feet, Italian map). *August* 28.—Mr. W. H. Cozens Hardy, with Theodor Andermatten, crossed from the Monte Moro, over the Thälliboden Glacier, passed the Mondelli Pass, and continued to the N. up snow and stone slopes to the summit of the peak, gained in 1 hour quick walking from the Monte Moro. The descent was made down the steep slopes to the Distel Alp.

This is believed to be the first time that the peak has been ascended by a traveller. The point marked 3,059 and 3,054 mètres on the maps just S. of the Ofenthal Pass or Passo d'Antigine, is sometimes called

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Pizzo d'Antigine (*e.g.* by Tschudi in the 'Turist in der Schweiz,' thirtieth edition, p. 302), and is named the E. point of the Pizzo by Signori Bazetta and Brusoni, in their 'Guide de l'Ossola' (second edition, p. 132).

Sonnighorn, or Pizzo Bottarello, by the N.W. Arête (3,492 mètres = 11,457 feet, Siegfried map; 3,489 mètres = 11,449 feet, Italian map). *July* 26.—The Rev. J. D. James, with Ambrose Supersax and Emanuel Imseng, starting from the Almagel chalet at 2.30 A.M., crossed the valley, and by débris and stones mounted to the ridge between the Almagelhorn and the Sonnighorn, just where it touches the former peak. Descending on the Antrona Pass side for a short time, the party took to the rocks of the arête at 6.30. The arête consists of successive knife-edges of rocks (which have to be passed astraddle) with sudden descents between. The passage of the ridge took about three hours, the summit of the peak being reached a little before ten. The descent was made by the Furggthal to Almagel and Saas.

Lepontine Alps.

Bortelhorn, or Punta del Rebbio, from the North (3,195 mètres = 10,383 feet, Dufour and Italian maps; 3,204 mètres = 10,512 feet, Siegfried map). *July* 17.—Mr. Coolidge with young Christian Almer ascended this fine peak from Binn and by the N. side, a route which does not seem to have been yet taken. Starting from the comfortable little Hôtel Ofenhorn at Binn, they reached the summit of the pass to Bérisal over the Steinen Glacier by the usual route through the Mättithal and by the Rämi Glacier (4 hrs. from Binn). Steering nearly due S. across the glacier, they climbed in 1 hr. 8 min. by the N. face and a small stone gully up to the crest of the ridge between the Bortelhorn and the Hüllehorn (Punta Mottescia), not far from the point named Bocca Mottescia by the new Italian map. Thence, in a gale of wind, they ascended along the N.E. ridge of the Bortelhorn to the summit of the peak (50 min.). The weather having improved, the magnificent view came out very well. The peak stands at the junction of three ridges, so that thence Bérisal, the Veglia Alp, and very nearly Binn itself are seen at the same moment. The return to Binn by the same route took 2 hrs. 50 min.

The ascent is most commonly made from Bérisal by way of the Bortel Alp and the W. side (several cards of parties coming that way were found in the cairn), and by the new route it may be conveniently taken on the way from Binn to Bérisal. It was first ascended from the Italian side, on July 17, 1889, by Signor Edoardo Perondi with Vittorio Roggia, Mr. Coolidge's party, coming from Binn, reaching the top, and finding the card of their Italian predecessors just as the latter regained the inn at the Veglia Alp. The ascent from this inn took just 4 hours, and was effected from the Rebbio Glacier by way of the great rocky spur between that glacier and the Mottescia Glacier, which joins the N.E. arête of the peak not very far from the summit.*

* *Rivista Mensile del C.A.I.* August 1889, p. 261.

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Bernese Oberland.

SCHRECK JOCH (about 12,100 feet). *August* 17.—Messrs. E. Petherick and A. F. Mummery, without guides, left the Schwarzegg hut at 1.20 A.M., and climbed the great couloir west of the Schreckhorn to the upper Kastenstein Glacier. Traversing this, they ascended at first by steep snow-slopes, and subsequently, to avoid the labour of step-cutting, by the rocks to their right, to the lowest gap in the ridge connecting the Nässihorn and the Schreckhorn. The descent was begun at 8.30 A.M. A steep, but short, slope of ice and snow, terminating in a somewhat formidable bergschrund, led down to the highest plateau of the Lauteraar Glacier. The slopes below proved to be intersected by large crevasses, and the level glacier was not reached till nearly mid-day.

This appears to be the first occasion on which the Lauteraar Glacier has been reached from the Lower Grindelwald Glacier.

SOUTH-WEST PEAK OF THE HÜHNERSTOCK (about 3,340 mètres=10,959 feet). *July* 10.—Herren A. Körber and A. Baumgartner, Pfarrer Baumgartner of Brienz, and Pfarrer Studer of Ringgenberg, with Johann Tännler, Andreas Anderegg, and Johann Moor, made the first ascent of this peak, starting from the Pavillon Dollfus. 'The ascent was difficult, and was characterized by the guides as one of the worst in the Bernese Alps' ('eine der bösesten in den Berner Alpen').*

The first ascent of the highest point of the Hühnerstock (3,348 mètres=10,985 feet) was made on September 15, 1886, also from the Pavillon Dollfus, by Messrs. Coolidge and Gardiner, with Christian and Rudolf Almer, the climb being found exceedingly difficult.†

GWÄCHTENHORN FROM THE THIERBERGLIMMI (3,428 mètres = 11,247 feet). *July* 3.—Mr. Coolidge with young Christian Almer crossed this peak from the Thierberglimmi to the Sustenlimmi on the way from Stein to the Göschenen Alp. The ascent by the N.W. arête took an hour and was perfectly easy. There does not seem any record of this route having been previously taken, though it avoids in a very pleasant way the weary trudge through the soft snow of the basin between the Gwächtenhorn and the Sustenhorn. The Gwächtenhorn is the peak ascended in August 1861 from the Sustenlimmi by Messrs. R. W. E. Forster and Hardy Dufour, which was later known as the Steinberg, and is totally distinct from the Thierberg. The topographical evidence is sufficient to prove the identity of the point, as is also the appearance of the peak when close to the summit, for it is precisely the aspect figured in the engraving given with the narrative of the 1861 ascent.‡

SUSTENHORN FROM THE EAST (3,512 mètres=11,523 feet). *August* 4.—Herr August Naef, with Joseph Z'graggen of Göschenen, made

* *Schweizer Alpen-Zeitung*, 1889, p. 158. It is probable that this peak is identical with that marked 3.110 mètres on the Siegfried map, for the 1886 party saw no point near the peak climbed by them which seemed to be as high as a point of 3,340 mètres.

† *Alpine Journal*, vol. xiii. pp. 121-2, 309-13.

‡ *Peaks, Passes, and Glaciers*, 2nd series, vol. ii. p. 90. See *Alpine Journal*, vol. ii. p. 413.

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the first ascent of this peak from the East, starting from the Hornfeli Alp in the Voralpthal, and not meeting with any special difficulties.*

Bernina District.

Piz Roseg (3,943 mètres = 12,937 feet) by the N.W. Arête. *September* 10.—Mr. J. H. Wainewright and Dr. R. S. Wainewright, with Martin Schocher and Christian C. Grass, made this new route up Piz Roseg, which is almost at right angles to that followed by Mr. T. Middlemore and M. Cordier on August 18, 1876.† Starting from the Roseg Restaurant, they mounted the Tschierva branch of the Roseg glacier. Crossing the lower slopes of Agaglious, and ascending a much crevassed slope of névé, they reached the N.W. arête by a steep snow slope. The last named slope, which was much the hardest part of the ascent, took 2½ hours, and, if ice or soft snow, would be very troublesome. Ascending along the N.E. side of the N.W. arête by steep snow and iced rocks, the party joined the usual route at the top of the snow couloir just below the first peak, going on to the highest peak by the ordinary ridge. The ascent to the summit of the highest peak took 9 hours actual walking from the Roseg Restaurant. This route can hardly be recommended as either easier, or shorter in point of time, than the usual route, though it is much more direct.

Eastern Alps.

Ortler Spitze by the Marltgrat (3,902 mètres=12,802 feet). *August* 22.—Herren Otto Fischer, Ludwig Friedmann, Robert Schmitt, Edward Matasek, and Albrecht Von Krafft, without guides, achieved the climb up this ridge to the upper plateau of the Ortler, which was thus reached from the N.E. Starting at 1.30 A.M. from Sulden, they mounted, by way of the Kuhberg and the Ende der Weltferner, to the foot of the ridge, attained at 6 A.M. They climbed up to its crest, which was followed throughout, though once forced down on its S. face. Up to 11.10 no special difficulties were encountered, but, after that, clouds and a storm, besides the increasing difficulties, rendered progress slower. After forcing many gendarmes, and being exposed to a driving snow storm from 2 P.M. onwards, the upper plateau of the Ortler was gained at 7 P.M.; but the lateness of the hour and the bad weather compelled the party to desist from going on to the summit of the peak, and to descend to the Payerhütte, which was reached at 9 P.M.

A few days before Herren Fischer and Schmitt succeeded in descending from the Ortler to the Hochjoch, the first time that this difficult route has been taken down.‡

Monte Cristallo by the N.N.E. Ridge (3,199 mètres = 10,496 feet). *August* 19.—Herr Emil Artmann, with Josef Innerkofler, of

* *Schweizer Alpen-Zeitung*, 1889, p. 168.

† *Alpine Journal*, vol. viii. pp. 109, 201, 464–5.

‡ *Mittheilungen des Deutschen und Oesterreichischen Alpenvereins*, 1889, p. 209.

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Sexten, succeeded in climbing this peak by the ridge to the right of the great ice couloir, thus avoiding both the dangerous traverse of this gully and the main glacier altogether. The party thus gained the snow arête, which joins the N.E. peak to the highest point, and forms the end of the great ice couloir. Starting from Landro at 2.15 A.M., the highest point was gained at 10.15 A.M. Herr Artmann reports that the climb up to the ridge and the middle bit of this ridge are among the hardest bits of climbing in the Dolomites. His party took 4 hours from the foot of the rocks to the top of the peak.*

DACHSTEIN PLATEAU BY THE SOUTH WALL. *July* 14.—Herren Robert Schmitt and Fritz Drasch, without guides, succeeded in scaling the great southern precipices of the Dachstein plateau, which had been frequently assailed before, but in vain. Attacking the rocks at 10.30 A.M., the party encountered and overcame excessive difficulties, and were forced to bivouac at 9.15 P.M. Next morning they gained the Untere Windlücke, a notch between the Thorstein (2,946 mètres) and the Mitterspitze (2,920 mètres), over easy ground in 30 minutes, thus gaining the great plateau on the S. edge of which, and separated from the Untere Windlücke by the Mitterspitze and Obere Windlücke, rises the rock-tower, which is the highest point of the group (2,996 mètres). This peak itself was not reached by the party of July 15, 1889, which forced the S. wall of the Dachstein plateau, but in no wise ascended the Dachstein peak from the S. The climb is described as exceedingly difficult, and the way taken was marked by slips of red paper left behind.†

NORWAY.

Justedals bræ.

FJÆRLAND TO STARDAL BY BEFRINGS SKAR (about 5,800 feet). *August* 10.—Messrs. Wm. Cecil Slingsby, Geoffrey Hastings, J. W. Sutton, and F. Grove, made the first known passage of the above. They left Mundal at the sea level at 5 A.M., and crossed the Böiums bræ above the lower icefall, then they skirted the eastern bank of this glacier, and gained the great snow-field above the top ice fall. After some difficult steering in mist, where there were no landmarks, they tried to descend to Stardal by Fonsdals bræ, but were fortunately soon beaten back by crevasses a quarter of a mile long. Then they turned due West, and after vainly trying to descend to a lake of turquoise blue in the western fork of Befringsdal, they turned at 7.30 P.M. over a rocky ridge to the eastern branch, where, after passing a beautiful little Marjelen See they found an easy way down Befrings skar to a sæter 9.45, and arrived at Aamot (= Waters' Meeting) in Stardal at 1.10 next morning.

AAMOT TO HVEITESTRAND (about 6,000 feet). *August* 12.—The same

* *Mittheilungen des Deutschen und Oesterreichischen Alpenvereins*, 1889, p. 197.

† *Ibid.* p. 171, where an outline sketch is given to show precisely the route taken, and *Oesterreichische Touristen-Zeitung*, 1889, p. 198.

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party wished to make a pass parallel to, but N. of, that first made in 1884 by Mr. Russell Starr. The glacier which he descended was wholly impracticable last August. They left Aamot at 3.30 A.M., and 10 minutes later they began to climb the eastern wall of the valley, accompanied by a strong lad, who guided them by a rugged and steep path used by bear hunters, and by the bears themselves, to a high basin called Björnebotn, or Bears' cirque. At 9.15 they reached the snow-field, and as Mr. Grove had no spectacles he was painted round about the eyes with lamp black to prevent snow blindness, which answered satisfactorily. After crossing over a snowy dome and snow valley they reached at 10.25 a rocky island, which Messrs. Slingsby and Ecroyd with two Norsk guides had climbed from Olden in 1884, and had then called Onsdags Næbbe, and on which they had erected a large cairn. On the first visit there was not a single crevasse anywhere near the rock; now it was nearly surrounded by séracs. At 11.35 they reached a height of about 6,000 feet, and then began to descend very gradually. After several futile attempts they managed to find a lane through a maze of crevasses, and at 1.10 P.M. they reached a somewhat narrow rock ridge between Langedal and the Austerdals Bræ, which latter glacier, under ordinary circumstances, they would have descended. The ice scenery was grander than what any member of the party had ever seen before. There were dozens of blue glaciers in sight, all of which were most wildly broken up. The party then followed the same dividing ridge, and reached Ny Sæter at 7.30, and comfortable quarters at Nordre Næs at 10.20. This route is longer and more difficult to find than that of Mr. Starr's, with a rock descent in place of that by the glacier, but it proved the feasibility of making a pass between Hveitestrand and Olden by way of Onsdags Næbbe.

LODALS KAUPE (6,700 feet) FROM THE N.E., AND PASS OVER THE JUSTEDALS BRÆ. *August* 30 and 31.—Messrs. Slingsby and Hastings with a young Englishman made the first ascent of Lodals Kaupe from Justedal. They left Faaberg at 5.30, and followed the usual route over the long flat Kaupe bræ which travellers take when going over to Stryn until 1.30, when they turned up a steep little glacier arm N.E. of the Kaupe, which descends from the foot of the peak itself. After a good fight with the crevasses, they were beaten back, and then took to a steep but broad mountain spur which was coped with ice. Here for 3½ hours they had good rock climbing and most interesting ice work, but much time was wasted, as the third man became hysterical and remained in that condition for the next 16 hours. At 6 P.M. they reached the top of the glacier from the lower part of which they had been beaten back. Then they tried to get round the Kaupe to the glacier beyond, but could only get over the bergschrund directly under the highest point of the peak which rises 600 or 700 feet out of the glacier. At eight o'clock the party halted and stopped 8¼ hours on a ledge where there was only good room for one person. Three inches of snow fell during the night. Fortunately, though only 100 feet below the summit of the mountain, they were on the lee side and only heard the gale of wind which was blowing. At 4.15 A.M. they started to climb again, and at 5.10 reached the top in a

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furious gale and a snowstorm. At 9.15 they unroped, and reached Bödal Sæter at 11.15 and Loen Vand at 4.40 P.M. This expedition was first rate, but the adventure under similar conditions is one which will not bear repetition. One of the party planned the ascent from the N.E. in 1874, and made the second ascent of the peak from the West in 1884.

Jotun Fjelde.

JOMFRUE (about 6,500 feet). *July.*—Herr Sulheim, in company with a Frenchman, made the first ascent of this difficult rock peak, one of the Maradals-Tinder, from Midt Maradal, and met with extremely good climbing.

SAGEN (about 6,000 feet). *July.*—The last named party made the first ascent of this mountain, the Northern Melkedals-pigger, from Skogadals bræ, and found it to be easier than what was expected.

AUSTABOT-TINDER (7,020 feet and 6,712 feet). *August* 17.—Messrs. Slingsby, Hastings, E. T. Hartley and Herr Sulheim made the second ascent of the highest peak and first ascent of the northern one. They started from an unfinished hut in Berdal, and, after crossing Berdals bræ, followed the northern arête over the north peak to a col under the highest, which they climbed by an interesting narrow and steep arête. This peak is most beautiful, and was first climbed by Herr Carl Christian Hall, a member of the Alpine Club. Wishing to combine a new pass with this ascent, they descended by most difficult rocks from the above-named col to a tongue of the Berdal Glacier which sloped steeply down to a wide double bergschrund, 250 feet below. This tongue unexpectedly proved to be hard ice, and the party were 4¼ hrs. in cutting their way down this most difficult slope to the bergschrund, which they crossed in the dark. To add to the general uncanniness of the scene, a raven croaked most dismally just above the party all the time of the descent. Ultimately the party had to spend nearly four hours in darkness and drizzle at the top of a col between Berdals bræ and Gravdal.

This expedition was most enjoyable, though on account of bad weather the pass was given up.

SMUKE JENTE-TIND (6,120 feet) AND SOUTHERN MELKEDALS-PIG (6,820 feet). *August* 21.—Two Norsk girls—Ronnaug Garmo and Anne Aukrust—with Messrs. Slingsby and Hastings, made the first ascents of the above-named peaks by way of the Skogadals bræ. It is only fair to add that the higher peak was, fortunately, climbed in mistake for Uranaastind in a fog. Some very interesting rock-climbing was met with, and the scenery was magnificent.

MARADALS BRÆ. *August* 23 and 24.—Messrs. Slingsby, Hastings, and Herr Sulheim made a thorough exploration of this noble glacier, but failed in an attempt to make a fine new pass, as well as on a grand peak, though the climbing they encountered was exceedingly difficult.

URANAASTIND (6,836 feet). *August* 25.—Miss Dickinson and Miss Wickham, with Messrs. Slingsby, Hastings, Hartley, and Herr Sulheim ascended this peak from the cosy hut at Skogadals böen, by way of the Skogadals bræ, this being the first time the peak has been gained

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by English ladies. They met with a herd of reindeer on the glacier, and a most sensational bergschrund charmed the ladies very much. On the summit, three mariners' compasses pointed three different ways, owing to the presence of iron.

EAST STYGGEDALS-TIND (about 7,600 feet). *August* 26.—The last-named party, with the addition of Mrs. Hartley, made the first ascent of this fine peak by ladies. Though not difficult, the ascent was most enjoyable, and combined all kinds of mountaineering. The views are very grand, and the summit consists of a most beautiful and narrow snow arête, which ends abruptly W., above an overhanging precipice of 1,400 feet. The party took 6¼ hrs. up and 4¼ down, from and to, Skogadals böen.

Söndmöre.

BREKKE-TIND (about 5,800 feet). *September* 3.—Messrs. Slingsby and Hastings made the first ascent of this fine peak. They left Fibelstadhaugen at 7, crossed the pass of Skylstad, and, after climbing most difficult rocks, they reached the summit of a nameless peak or spur of the Brekke-tind at 1.40. After spending 50 min. in taking angles, they crossed a glacier not shown on the Amts kart, and gained the N. arête of the peak. This arête is extremely narrow and jagged, and is, here and there, perforated with big holes. It is hardly necessary to add that some rare good climbing was met with. At 4 o'clock they reached the top, and spent an hour there taking angles, and longing for more time to climb in this region. They found an easier line of descent.

KVITELVEDALS SKAR. *September* 4.—Messrs. Slingsby and Hastings made the first recorded passage of the above-named col between Fibelstadhaugen and Bjerke. This pretty pass leads through some of the wildest scenery in Söndmöre, and will, some time, be a great favourite with active walkers. It only takes about 5 hrs. The descent from the Tysse Vand to Bjerke is most interesting to geologists, as the track goes through a series of very narrow gorges evidently originally water-worn, but which have been polished by ice in more recent times.

"The weather in Norway during the months of June, July, and the beginning of August last, was the finest that living Norskmen have ever known. During much of this time there was actual sunshine upon the mountains of nearly 20 hours during the day. All who climbed in Norway in August or September found the glaciers exceptionally difficult to traverse, in fact many were impassable, as ice-falls and séracs were frequently met with that were unknown before. In place of slopes of steep névé, hard blue ice was the rule. Unusual caution was necessary on the glaciers owing to the presence of innumerable thin lips which projected far over the crevasses on the sunny side, and which seldom showed any depression on the surface. Plenty of adventures were met with as a matter of course, and it was quite a common occurrence to be benighted high up on the mountains. Another most noticeable fact was that, instead of meeting, as usual, with a few square yards of pink snow, many acres were frequently seen at a time."

W. C. S.

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ALPINE NOTES.

WINTER MEETING AND DINNER.—The Annual General Meeting of the Alpine Club will be held at the Club rooms on the evening of *Monday*, December 16.

The Picture Exhibition and Winter Dinner will take place at the *Whitehall Rooms* (*Hotel Métropole*) on the afternoon and evening of *Tuesday*, December 17. An endeavour will also be made to organise on a more extended scale an exhibition of Alpine appliances, to be held at the same time, and to be transferred, if practicable, to the Club rooms for some days subsequently. Loans of such appliances, and of pictures, photographs, &c., will be gladly welcomed, and it is specially requested that all communications relating to such loans may be sent as early as possible to the Honorary Secretary of the Club, F. O. Schuster, Esq., 50 Belsize Square, South Hampstead, N.W.

CHANGE IN THE EDITORSHIP OF THE 'ALPINE JOURNAL.'—Mr. Coolidge has resigned the editorship of the 'Alpine Journal,' after having held it since August 1880, a longer period than any of his three predecessors—Mr. H. B. George, 1863–67; Mr. Leslie Stephen, 1868–72; and Mr. D. W. Freshfield, 1872–80). The vacant post has been offered by the Committee of the Alpine Club to Mr. A. J. Butler, who has consented to accept it, and to whom all communications for the Editor should be henceforth addressed at the Alpine Club Rooms, 8 St. Martin's Place, Charing Cross, W.C.

PUBLICATIONS OF THE CHIEF FOREIGN ALPINE CLUBS IN 1888.—It may be interesting to our readers to see the sums spent in 1888 by the chief foreign Alpine Clubs on their periodical publications. The German and Austrian Club spent 2,128*l.* on its annual volume (the 'Zeitschrift'), and 1,693*l.* on its fortnightly journal ('Mittheilungen')—in all 3,821*l.* for the year, or about 59 per cent. of the ordinary income of the Club; the estimate for 1889 is 3,765*l.*, and that for 1890 is no less than 4,687*l.* The Italian Alpine Club expended 279*l.* and 258*l.* respectively, or in all 537*l.* (26 per cent. of its gross income), on its two publications ('Bollettino' once a year, 'Rivista Mensile' once a month). In the same year the Swiss Alpine Club made a profit of about 60*l.* on its 'Jahrbuch,' and gave 40*l.* as an annual subsidy to the 'Echo des Alpes,' the organ of the French-speaking sections. The French Alpine Club spent 915*l.* on its 'Annuaire,' and 285*l.* on its 'Bulletin' (nine numbers a year), or 1,200*l.* in all, being 33 per cent. of its gross income.

SIX HUNDRED 'GRANDES COURSES.'—We are informed that towards the close of last summer Mr. Coolidge accomplished his 600th 'grande course' in the Alps. Every peak included in this list is 10,000 feet (roughly speaking, 3,000 mètres) or more in height, as is also nearly every pass, the few passes below that limit being in every case glacier passes, and within a few feet of the 10,000 feet limit. We learn, further, that this large number of 'grandes courses' has been made in the course of twenty-five consecutive summer, and three winter, campaigns among the mountains, and that all these expeditions, with the exception of fourteen, were carried out in those portions of the Western

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and Central Alps which are comprised between the Col de Tenda on the south, and a line drawn from the Lake of Lucerne to the St. Gotthard Pass on the east.

MOUNTAINEERING IN AFRICA.—It is announced that in July last Dr. H. Meyer, undaunted by his previous failures and adventures, started again to attempt the ascent of Kilima-Njaro. He was accompanied by the well-known German climber, Herr Ludwig Purtscheller of Salzburg. Letters received from the party, dated Zanzibar, August 30, stated that the preparations for starting had taken so long that they would not be able to get off till the beginning of September. They expect to spend three months in exploring the Kilima-Njaro group, and then to proceed to Mount Kenia, having arranged to be absent from Europe for about a year. Should political troubles prevent them from accomplishing their explorations in Eastern Africa, the party propose to sail for New Guinea.

ROYAL MOUNTAINEERING.—The Queen of Italy, whose visit to the Col du Géant we recorded last year,* spent the month of August last in and around Gressoney St. Jean.† During her stay she made many excursions among the neighbouring hills, visiting the Lys Glacier and also the Col d'Ollen. The most considerable expedition undertaken by her Majesty was an excursion to Zermatt, which was reached on August 20 by way of the Betta Furka, Cimes Blanches, and St. Théodule. The weather was, unfortunately, very bad during her sojourn at Zermatt, but on August 24 the Queen went to the Gornergrat, where she drank to the health of the Queen of Great Britain, in acknowledgment of the cheers of an English party on the summit. On August 26 her Majesty ascended the Breithorn, spending two nights at the St. Théodule inn, and regaining Gressoney St. Jean next day by the same route as that by which she had come. The Breithorn (13,785 feet) is as yet the loftiest point which has ever been reached by a reigning European sovereign. Queen Margaret, in undertaking high ascents, has followed the example set her by the sovereigns of her illustrious house. Yet though Charles Emmanuel II. (August 5, 1659), Victor Emmanuel II., and (before his accession) Humbert I. all climbed up the Roche Melon, that peak is but 11,605 feet high, and has a zigzag path in lieu of a glacier on the Italian side, so that the present Queen of Italy, by her latest mountaineering feat, has completely distanced all her royal predecessors.

BOTH PEAKS OF THE AIGUILLE DU DRU IN THE SAME DAY.—The traverse from the higher to the lower peak of the Dru was first achieved by Monsieur Henri Dunod, on August 31, 1887, with Emile Rey and François Simond (see 'Alpine Journal,' xiii. 409; 'Annuaire du Club Alpin Français,' 1887, pp. 97–101).

Last summer the feat was repeated, and in a very ingenious way, both up and down. Miss Katharine Richardson, with Emile Rey and J. B. Bich, left the Montenvers inn at midnight, on August 30 last,

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* *Alpine Journal*, vol. xiv. p. 163.

† A full account of her sojourn has been published by M. de Peccoz in the *Rivista Mensile del C.A.I.* September, 1889, pp. 273–9.

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and gained the summit of the Petit Dru at 9.50 A.M., while Messrs. W. Williams and T. A. Nash, with François Simond, Frédéric Payot, and Auguste Cupelin, also starting from the Montenvers at midnight, attained the top of the Grand Dru at 9.55 A.M. Both parties left their respective peaks at 10.45 A.M. Miss Richardson and her guides descended to the notch between the two summits, and then climbed up to the foot of a cliff 60 feet high, and practically perpendicular. Meanwhile the other party had descended to the upper edge of these steep rocks, and let down two of their number by a rope, Émile Rey, on the other hand, being hauled up to within a few feet of the top, and then lodged firmly on a ledge, helping the other members of the two parties. Thus three persons were hauled up and five let down these rocks in the space of two hours. The time taken by each party in effecting the traverse from one peak to the other was approximately three hours. Miss Richardson's party regained the Montenvers the same night at 10.15 P.M., but the other, more numerous, party were benighted on the rocks of the Petit Dru, one hour above the glacier.

This is the first time that the Grand Dru has been reached from the Petit Dru.

RAILWAY UP THE JUNGFRAU.—Whether anything comes of the following proposal or not, this telegram in the *Standard* of October 21 deserves to be preserved as a curiosity:—'The engineer of the Eiffel Tower, Herr Köchlin, has applied to the Swiss Federal Council for authorisation to construct a cog-wheel railway to the summit of the Jungfrau from Lauterbrunnen.' The following particulars taken from the Swiss papers of October 21 show that M. Köchlin at least is a firm believer in the practicability of his bold project. The first bit of the line will be along the Lauterbrunnen Valley as far as Stechelberg (rather over 3 miles). Thence to the summit of the Jungfrau the distance is reckoned at $3\frac{1}{2}$ miles more. On this bit there will be six tunnels (the longest about $1\frac{1}{2}$ miles long), and the line will attain the peak at 5 minutes below the highest summit, on which an inn will be constructed. The line will be either a funicular railway (like that at Glion) in five bits or on the cog-wheel system (like the one on Pilatus). The slope is estimated at 50°, and the period required for building the line at seven years. The cost of construction is reckoned at 9,746,000 francs (about 390,000*l.*), of which 546,000 francs (about 22,000*l.*) are for the valley bit, and the rest (368,000*l.*) for the mountain line proper.

On the other hand, as the price of a single ticket (does this mean that one can go 'en pension' in the inn on the summit?) is to be 25 francs and a return one 35 francs, while thirty working days a year are counted on, and 35,000 visitors hoped for annually, the gross annual receipts are calculated as likely to be from 35,000*l.* to 49,000*l.*, or from about 9 to $12\frac{1}{2}$ per cent. on the capital.

M. Köchlin has, however, already found a rival, as appears from the following telegram from Berlin in the *Standard* of October 24:—'A Lucerne engineer, already favourably known as the builder of the Brünig Railway, has petitioned the Swiss Federal Council for the concession to build a railway up the Jungfrau. He estimates the expense

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at five million francs, or only half as much as Herr Köchlin, yet he demands that nearly double the fare proposed by Herr Köchlin shall be charged—viz. 65 francs, instead of 35.'

THE GROSS VIESCHERHORN BY THE NORTH-WEST ARÊTE.—There has been a little confusion lately as to the first party which ascended the Gross Viescherhorn by the N.W. ridge. For many years it was supposed that this route had been taken on August 4, 1863, by Messrs. G. Chater and Hopper with Ulrich Kaufmann and Peter Baumann, as stated in a note published in these pages; * but in 1885 Herr Lorria reported that, according to Peter Baumann, this party had *not* climbed the N.W. ridge,† and narrated his own attempt to descend it (July 27, 1885), which failed, owing to the dangerous condition of the snow lying on the ice. The question was thus supposed to have been settled, but it has been recently reopened, and it now seems certain that the 1863 party did climb a bit of the N.W. arête, though not the whole of it. Mr. Chater has referred to his diary, and has found his copy of the Dufour map on which he marked his route at the time he made it. His party appears to have climbed the snow gully (well shown on the Siegfried map) leading from the Ewigschneefeld to the crest of the N.W. arête just at the N.W. foot of the final rocks of the peak—this gully lying just N. of the great rocky spur descending from the peak in a S.W. direction. Mr. Chater's party took 1½ hrs. from the glacier to the ridge, and then, keeping rather on the right-hand side of the ridge, climbed at first steep ice with rocks here and there, and then rocks only, up to the summit, gained in 1½ hrs. from the time the ridge was struck. The descent to the Ewigschneefeld was made by the same route and took 1 hr. 55 min. Thus the 1863 party climbed, roughly speaking, about one-third of the N.W. arête, reckoning from the depression E. of the point marked 3,642 mètres at the base of the peak. Peter Baumann, when consulted on the subject in the spring of 1889, was of opinion that he had climbed the N.W. arête in 1863, but only a small bit of it. The other guide in 1863 was Ulrich Kaufmann, whose death was recently recorded in these pages,‡ and not Peter Kaufmann, as stated by Herr Lorria. Ulrich Kaufmann had been with Messrs. George and Moore and Christian Almer on the occasion of the first and only previous ascent, and in 1863 pointed out to Mr. Chater the 1862 route, which lay over the great S.W. spur.

Thus in 1863 only the upper third of the N.W. arête had been ascended. It is to Mr. Hermann Woolley that the honour belongs of having first traversed (on July 31, 1887) in its entirety this arête, and he was followed on July 22, 1888, by Mr. Coolidge, who at the time was ignorant of the 1887 expedition,§ and had been twice prevented (July 4, 1886, and July 20, 1887) from trying it after bivouacking at the Berglihütte. The N.W. arête was again climbed on September 14, 1888, by Herr Carl Lüscher, of Basel, and once more on September 28, 1888, by Dr. Dübi, of Bern, who descended it only, having on

* *Alpine Journal*, vol. i. pp. 319–20.
† *Ibid.* vol. xiii. pp. 380–1.
‡ *Ibid.* vol. xiv. p. 321.
§ *Ibid.* vol. xiv. p. 156.

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the previous day climbed the Ochsenhorn by the N. arête and slept at the Concordia hut.

Thus the ascent of the Gross Viescherhorn by the N.W. arête is now one of the well-established 'grandes courses' of the Oberland.

Dr. Dübi has published, in the current 'S.A.C. Jahrbuch,' pp. 102–22, a most interesting monograph on the Viescherhorn group. It should be carefully studied by anyone interested in this range, which has received very little attention as yet, considering its great height and grand appearance from Grindelwald. To avoid confusion it may be pointed out that the Viescherjoch was first crossed on July 30, 1862,* *not* on July 8, 1863, as Dr. Dübi states; and that on September 6, 1872, Mr Coolidge was the only amateur in the party which went up the Gross Viescherhorn, neither Miss Brevoort nor Mr. Fairbanks making the ascent that day. Dr. Dübi has, too, apparently overlooked an elaborate note in these pages † clearing up the confusion between the Viescherjoch and the Ochsenjoch.

THE MÄRBEGGLÜCKE.—As it was our intention to reach the Lötschenthal from Kandersteg, and we (Mr. C. Cannan and myself) did not wish to cross the Lötschen Pass, it was decided that we should attempt the pass known to Tschudi ‡ as the Märbegglücke, and to the large Federal map as the Märwiglücke; the 'Lücke' is a well-marked depression in the rocky 'grat' connecting the Sackhorn and Hockenhorn, and is visible both from the upper Gasterenthal and from the slopes of the Lötschenthal opposite Ried.

Taking with us two incompetent 'guides' we started from Kandersteg about 2 A.M. on Monday, August 5, and reached Selden between 5 and 6. It was then raining heavily. When it partially cleared we began the ascent, crossing the Kander, and going directly S. from Selden. The next two hours were not agreeable; a long couloir of avalanche snow was succeeded by tedious grass slopes, and these by a violent thunderstorm. When the rain had ceased—though the weather was still extremely disorganised—we had ascended to the crest of a narrow arête of grass and rock, sloping up to the rocky face of the main ridge. We had now to decide on our route. Below us to the left was a small glacier, or steep snow-slope—I forget now which—and to our left front the 'Lücke' itself, hollowed out of the ridge immediately S.W. of the Sackhorn, and seamed by two or three narrow couloirs. To cross it we must have descended to the glacier or snow-slope above mentioned, and then ascended either by one of the couloirs or the adjacent rocks, neither of which looked pleasant from the point of view where we stood, the rocks being apparently sloping slabs, and the couloir probably swept by stones. The guides knew nothing of the pass, except some vague reminiscences of a doubtful 'Gemsjäger'; and, though inclined to this route rather than to that which we eventually adopted, they regarded neither this nor any other with any approach to enthusiasm. Mr. Cannan then decided to ascend the rocks immediately before us, or, rather, to bear slightly to the right,

* *Alpine Journal*, vol. i. pp. 105–8. † *Ibid.* vol. xiii. pp. 266–7.
‡ *Der Turist in der Schweiz*, 30th edition, p. 89.

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and then begin the ascent. After waiting a short time for the weather to improve we did so, Mr. Cannan leading; it was then between 9 and 10. During the next hours I cannot remember how many 'gendarmes' we crossed or skirted, or how often we had to complain of the extremely dilapidated condition of this part of the Oberland; but, apart from the rottenness of the stones, the rocks, though consistently steep, were not, I believe, what is technically called difficult. Shortly after noon we had reached the summit of the ridge, and were rewarded by a good view of some of the Valais peaks. We stood on an elevated point above and immediately S.W. of the Märwiglücke, and in full view of both Sackhorn and Hockenhorn. The descent thence to Ried is unattended by difficulty.

M. Montandon writing in the 'Jahrbuch' of the S.A.C.* describes the passage of the Märwiglücke in the reverse direction. It appears that he descended one of the couloirs I have spoken of, thus traversing the depression itself, not keeping to the S.W. of it as we did. His route is very likely the right one, and appears from his account to be not extremely difficult. I have only written of our ascent because it may provide climbers with a variation from the somewhat tedious route of the Lötschen Pass.—A. D. Godley.

The Weisshorn from the Zinal Side.—On August 8 last I made the ascent of the Weisshorn from this side, accompanied by my two guides, Ulrich and Hans Almer, of Grindelwald. Unfortunately I took no notes during the expedition or immediately after it. I was unaware at that time of the immense difficulty of the ascent by this route, and I had not even read up beforehand the accounts of their ascents given in previous numbers of the 'Alpine Journal' by Mr. Passingham † and Mr. Farrar. ‡ Also our intention had been to make an attempt by the S.W. arête, so that my attention had been wholly directed to that point, which we had prospected on our descent from the Rothhorn on the 6th. At the last moment we determined to attack the mountain on the western face, and I found, during the long day that succeeded this resolve, that my whole attention and energies were wanted to successfully accomplish what proved to be an exceedingly difficult and (I say it with all seriousness) dangerous climb. I was under the impression at the time that the last six hours of our climb was by an entirely new route, and though I find many points of similarity in Mr. Farrar's account, I think the probabilities are, when comparing his account with my own impressions, that we struck on different routes, but with much the same difficulties and surroundings. We slept at the chalet on the Arpitetta Alp, where we spent a most comfortless night, and started at 3 A.M. The first hour was over moraine, and the next two hours or less were spent on the Weisshorn glacier, and in getting off the glacier on to the rocks. The latter we found a most difficult operation. The next three hours or so we were working along an arête of rock which runs up this face of the mountain. This ridge was exceedingly diffi-

* Vol. xviii. 1882–3, pp. 89–94.
† *Alpine Journal*, vol. ix. pp. 366, 427–31: August 13, 1879.
‡ *Ibid.* vol. xi. pp. 416–17: August 15, 1883.

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cult, as loose and crumbling rocks abounded everywhere, and sometimes we were really in great danger. This ridge finally terminated in a short snow arête which led up to a kind of rocky tower, on which was a small cairn of stones, where a letter was found, left by some guides who had been on the search for the body of Herr Winkler, who in August 1888 attempted the mountain alone and was lost.* At this point our greatest difficulties commenced. Slabs of rock such as those mentioned by Mr. Farrar were crossed with much difficulty, strata of ice being sandwiched in with the ice-glazed rocks in places. Step-cutting was perilous work on these occasions, as the coating of ice was too thin to allow of firm foothold, and a heavy party possibly would not have got across. We had two very steep snow couloirs to ascend, broken occasionally by sheets of hard ice and slabs of rock, the traverse of which at an almost impossible angle of steepness was very difficult and perilous. Luckily the weather was fine, and a cold wind kept the snow in a good condition. Finally, after about six hours of slow but exhausting climbing, partly over snow, partly over rocks, the N. arête was struck about half an hour or so from the summit, which we reached at 4 P.M. The route taken may be one of those suggested by Mr. Farrar, when he says, 'Probably several lines of ascent might be struck out over this broad western face;' and I entirely agree with his remark, 'a really easy way would be difficult to find.' The Almers said the route taken was 'too dangerous' to allow us to think of returning that way. We had taken 13 hours to the summit, including two or three moderate halts. The descent, which in comparison was ridiculously easy, was made to Randa, and was quickly accomplished. About 3 hours to the hut (including half an hour's halt), and a little more than 2 hours on down to Randa by the fitful aid of a moon, brought us to the hôtel about 10 P.M., 19 hours from the start. I was singularly fortunate in my guides, who were excellent, Ulrich showing real genius under most difficult conditions, and Hans rendering powerful aid on all occasions.

THEODORE CORNISH.

COL DE LA TOUR NOIRE.—The 'Echo des Alpes' (No. 3, 1889, pp. 188–9) announces that, in consequence of representations from different quarters as to the inconvenience of altering the name of this well-known col crossed in 1863. M. Barbey has abandoned his proposal † to rechristen it 'Col des Améthystes,' and proposes to call the as yet untraversed col between the Aiguille de la Neuva and the Tour Noir the 'Col Supérieur du Tour Noir,' to distinguish it from its neighbour.

A note in the same periodical (pp. 231–2) asks for information as to the gender of 'Tour' in this region, so we hope that this curious grammatical question will soon be settled. It seems that though the literary gender of the word is feminine—and is so still in the valley of Chamounix—the masculine gender has been adopted by M. Javelle and others, it does not appear on what authority.

PHOTOGRAPHS OF THE BERNINA AND DISGRAZIA DISTRICT.—Mrs.

* *Alpine Journal*, vol. xiv. p. 136.

† See last number of *Alpine Journal*, pp. 405–6.

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Main and Herr A. Lorria propose to publish a collection of photographs illustrating this district in the same way that the 'Pennine Alps' were illustrated in the first volume of the 'Alpine Portfolio.' The work will contain about 100 heliogravures, of the same size as those in the 'Pennine Alps' volume, besides zincotypes in the text, including portraits of Engadine guides, winter scenes, &c., as well as letterpress, and will be issued by Messrs. Sampson Low & Co, Fetter Lane, Fleet Street, E.C., by whom orders for the work will be received. It will be bound in book form. The subscription price will not be higher than four guineas, possibly less, much depending on the number of subscribers. Promises of contributions from many amateur photographers have already been received, and Herr Lorria would be very much obliged if others who possess unpublished views of the district would kindly communicate with him (Schottenring 14, Vienna, I.).

The Grand Paradis.—After sleeping on August 8 last at the bivouac at the base of the rocks between the icefalls of the Tribulation Glacier (now known as the Balme des Bouquetins), I started next morning at 3 A.M. with my guides, Clemenz Zurbriggen of Saas, and Joseph Truffer of Randa. There had been thunder in the night, with some rain, but it was clear over the Tour Saint Pierre when we started. Climbing up the rocks to the great Plan de la Tribulation, we crossed the glacier to the foot of the rocks, which lead up to the lowest point between the Gran and the Piccolo Paradiso. Here a violent storm broke upon us, and we saw nothing until we were almost on top of the peak. Zurbriggen thought that the rocks were not safe in bad weather, and cut straight up the N.E. face of the peak, for three-quarters of the way in hard ice and then in snow. Finally we had to climb some almost overhanging rocks in order to reach the ridge halfway between the cairn and the true snowy summit, the latter being reached in a few minutes more. We were 6 hours cutting up the face, and 9 hours in all from the sleeping-place. Both Truffer and I were hit by stones, so that I cannot recommend our line of ascent.

Just before reaching the summit the sun came out and drove away all the clouds, so that we had a fair view. We descended straight down the Glacier de Lavetiau to the moraine separating it from the Glacier de Montandeyné (the way being perfectly easy), gained the king's hunting stables, and reached the Val Savaranche at Terre some way below Pont. Thence we went down to Dégioz, which we reached at 6 P.M., having reached the top at noon, and spending some time there and at the king's stables. At Dégioz I was surprised and pleased to find excellent accommodation for the night at the Cantine du Club Alpin. It is now easy to procure a carriage at Villeneuve, where the Val Savaranche joins the main Aosta valley. F. C. Mills.

Messrs. A. L. Mumm and C. A. James, with Clemenz Zurbriggen of Saas, and Joseph Jeantet of Cogne, started on September 6, 1888, to ascend the Grand Paradis from the Cogne side by way of the couloir falling to the Col de l'Abeille, which Messrs. Coolidge and Gardiner had descended on August 12 of the same year. They ascended the rocks of the ridge to the left (in ascending) of this couloir, but, having gained the summit of the couloir, were prevented by a violent storm

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from going on to the top of the Grand Paradis, 15 or 20 minutes off. The return was effected by some rocks a little to the south.

The Grand Paradis was ascended from the Cogne side on July 26, 1889, by Signori Corra, Dogliotti, and Gonella, with Michele Ricchiardi of Groscavallo, and Joseph Jeantet of Cogne. They ascended by exactly the same route as the party of September 6, 1888, finding no difficulties save at the very top of the couloir. They descended to Val Savaranche by the Glacier de Lavetiau. This party thus reached the Grand Paradis from Cogne by the new route *via* the Col de l'Abeille; but it is distinctly misleading to call this ascent 'the first complete ascent of the Grand Paradis from Cogne by way of the Col de l'Abeille,'* for it conveys the erroneous impression that some part of the route was new, whereas the great couloir, or the rocks at the side, had been twice taken before, and the party of September 6, 1888, had achieved the whole route save the last few minutes, during which the track is practically the same as on the ordinary ascent of the Grand Paradis from the Val Savaranche. W. A. B. Coolidge.

Inns and Huts in the Alps.—There are several important changes to record as to the inns and huts in the south-western Alps. The splendid new Grand Hôtel at Ceresole, in the Val d'Orco (a centre for undertaking many Alpine expeditions, particularly among the southern ridges of the Grand Paradis), was opened on July 1, and was visited early in August by Mr. Gardiner and myself. It is not quite finished as yet, but is most luxuriously fitted up, and rejoices in polyglot officials, the electric light, a ball-room, a lawn-tennis ground, and an occasional 'Times.' Everything was most excellent, but we found the prices excessively high (for two nights' lodging for ourselves and two guides we had to pay 109 francs 30 centimes!), so that mountaineers may be advised to put up with more humble quarters (and less exorbitant prices) at the old Albergo della Levanna, which stands just opposite and is still to be carried on. The Hôtel Royal at Noasca is a *succursale* of the Grand Hôtel at Ceresole. I heard very favourable reports of a new little inn at Dégioz, in the Val Savaranche. It is called 'Cantine du Club Alpin,' and is stated to be very clean and comfortable, while the food was very good. It contains two nice iron bedsteads in an upper room. It is to be hoped that it will be sufficiently patronised to ensure its continuance. At La Val d'Isère, 1 hr. above Tignes, in the upper Isère valley, M. Moris has opened a very decent little mountain inn, which I can highly recommend, after having visited it several times during the course of the past summer. The food is excellent, the *salle à manger* and bedrooms clean, and the prices very moderate. M. Moris has travelled much, and will make further improvements in his house if (as is to be hoped) he receives sufficient encouragement from travellers. La Val is connected by many glacier passes with Italy, while the easy tracks over the Iseran and Palet lead respectively to Bonneval and Bozel (for Pralognan). M. Culet, who has for many years kept a little inn at Bonneval (at the head of the Arc valley), which, at any rate since Mr. Cowell's visit in 1860, has been the

* So *Rivista Mensile*. See *C.A.J.* September 1889, p. 257.

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rendezvous of mountaineers wishing to explore the intricate ranges around, has, owing to age and infirmity, given up receiving travellers; while the accounts of Blanc's inn, in the same village, are very unfavourable. At Bessans, 1 hr. farther down the same valley, the Garinots have also retired; but fairly good and comfortable quarters may be found *chez* Cimaz, whose house is the first after crossing the great bridge when one comes from Lanslebourg. He promises further improvements. The Hôtel du Mont Blanc at Ste. Foy affords very fair accommodation. The Piantonetto refuge of the Italian Alpine Club was inaugurated at the end of June, and was occupied for two nights in August by Mr. Gardiner and myself, with our guides. Though small it has two rooms, and is very comfortably fitted up. It serves as a starting-point for the Tour du Grand St. Pierre by the S. face, the Rossa Viva, the Ondezana, and many passes, as well as for further explorations in the still imperfectly known ranges around. The hut stands on a bold rock promontory, half-way between the Col Monei and the huts of the Muanda di Teleccio, the latter of which it directly overlooks.

I learn that the Swiss Alpine Club has built a club hut near the fine Forno Glacier, which is not far from the Maleja Pass in the Engadine. It is on the last rocks on the right bank of the glacier about 200 feet above the ice, and just before the gap where a lateral glacier flows down, beyond which rises Monte Sissone. It contains two rooms, accommodating in all twenty-four persons, the sleeping quarters being arranged in three stories, and each person having a separate bed to himself. It is very completely furnished, and is very commodious. Three hours' walking from the Maloja or two from the Cavlocchia Lake suffices to reach the hut, which will be of great service to climbers, in particular for those wishing to make the ascent of the Monte della Disgrazia, to reach which hitherto from the Engadine a considerable circuit has been required. W. A. B. Coolidge.

The landlord of the little Trift inn has built a small house in the Mellichen Valley, just below the Obere Täsch Alp. It consists of one public room, and three bedrooms containing five beds, while below are the kitchen and guides' room. Everything last summer was clean and neat, while the charges were reasonable, except perhaps the wine, which was rather dear and decidedly indifferent.

A new Mountet hut has been constructed by the Diablerets section of the S. A. C., on a ledge just above the old one. It is called the 'Cabane Constantia.' On the ground floor are the guides' room (with places for five) and kitchen, in which is a magnificent stove, and every kind of pot, pan, and other cooking or eating utensils. Beyond this is the guardian's room, which was locked when we were there. Upstairs there are the ladies' room (with sleeping accommodation for seven), and the common room (intended to hold fifteen). The whole hut is admirably constructed and extremely comfortable. It is, I believe, proposed to establish a permanent guardian there, and to levy a small charge from visitors. George Broke.

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REVIEWS AND NOTICES.

Die Gletscher der Ostalpen. Von Dr. Eduard Richter. (Stuttgart: Engelhorn. 8vo. pp. 306. 12*s.*)

THE question which Dr. Richter sets himself to solve in this work is the following: In what extent and with what peculiar phenomena do glaciers appear in our territory, and what are the conditions—climatic and orographic—of their appearance? Closely connected with this are, of course, the much-debated questions as to the 'snow-line'; namely, the definition of the term, the determining causes, and the means of fixing its position in any given district. If the 'snow-line' be defined as the level at which the average annual snow-fall is exactly balanced by the annual melting, it is pretty clear that some relation must exist between it and the 'Firnlinie,' as German observers call the line at which névé passes into glacier ice, the boundary between the region of accumulation (Sammelgebiet) and the region of waste (Schmelzgebiet). We should say that Herr Richter somewhat exaggerates the difficulty of ascertaining this line. Of course it is not a sharp one; but, except when snow lies very deep, one can generally tell within a few score yards that névé has ended and ice begun. At any rate it may be taken as quite certain that Herr Richter is right in dismissing with some contempt Höfer's so-called 'law': 'the névé-line lies exactly midway in height between the levels of the upper edge of the névé and of the lower end of the glaciers.' A more amusing instance of a 'law' evolved from the discoverer's own consciousness it would be hard to find. As the author points out, the consequence would be that in two neighbouring glaciers, such as the Hintereis and the Mittelberg, flowing in almost the same direction, we should have to assume a difference of some 250 mètres in the névé-line, merely because the valley in which one lies is more favourable to the development of a long 'tongue' than is the case with the other. As a matter of fact, Dr. Richter considers it established that the division of a glacier into 'Firnfeld' and 'tongue' does not correspond exactly with the limit between 'Sammel-' and 'Schmelzgebiet'—i.e., we suppose, that true ice exists above the point at which the 'tongue' is developed. This would certainly seem to agree with one's ordinary observation. Further, that for glaciers which descend into the main valley (Thalgletscher) the ratio of the areas of 'Schmelz-' and 'Sammelgebiet' may be taken as approximately 1 : 3, so that by finding the 'isohypsic' line at which the area of the glacier is divided in these proportions, we may arrive, within very small limits of error, at the snow-line for the region; the results so obtained agreeing pretty closely with those given by other methods.

The greater part of the book is occupied with a study, executed with thorough German patience, of the characteristics of every glacier belonging to the groups which lie wholly or in part in Austrian territory. It is illustrated with many sections, and contains full maps of two or three portions of groups presenting any special points of interest. We

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notice that Dr. Richter departs from the usual estimate in putting the Gepatsch glacier second only among those of the Eastern Alps. According to him it is exceeded in length by the Pasterze when the measurements from the head to the end are taken along the 'air-line'; while, if it be taken along the surface of the ice, the Gepatsch, which starts from a greater height, has a slight predominance. In area, according to Dr. Richter's figures, the Pasterze is the larger, in almost the proportion of 4 : 3; but we suspect some error here. Certainly a comparison of the respective areas as laid down in the Generalstabskarte does not indicate a difference of this extent. However, there can be no question as to the superiority of the Pasterze in point of beauty.

Both these great glaciers, like all others, have lost much of their bulk in the last thirty years. In the case of the Gepatsch, which is the more steeply inclined, there has been a considerable shortening; while the more level Pasterze has lost chiefly in thickness. We are somewhat surprised to find that the total lowering of the surface in these and six other large glaciers which Dr. Richter names does not amount, when spread over the whole area, to more than about 23¼ feet. This of course implies an enormous total diminution of the bulk of ice; but anyone who has ever noticed the immense height of the old 'high-ice mark' above the present surface of any of these glaciers—the Pasterze, for instance, as seen from the Glocknerhaus—would have been quite prepared to hear that it was five times the amount. It would appear that the shrinkage is almost confined to the lower and outer parts of the glaciers—that is, it is due, not to a diminished supply of snow, but to a more rapid rate of melting. Dr. Richter is as far as any of his predecessors from being able to throw any light on the ultimate cause of this phenomenon; he can only suggest that 'glaciers are highly sensitive to the most insignificant fluctuations of climate, and by their periods of advance and retreat indicate variations in temperature and rainfall so slight as to be hardly noticeable in meteorological observations.' At any rate, all lovers of Alpine scenery may take comfort in the thought that a new period of advance seems to be setting in.

A. J. Butler.

The Alpine Portfolio. Edited by Oscar Eckenstein and August Lorria—*The Pennine Alps from the Simplon to the Great St. Bernard.* (London: Published by the Editors, 62 Basinghall Street, E.C. 100 photographs and descriptive letterpress in 4to. pp. 34. Price to subscribers, 5*l.* 5*s.*; on Japanese plate paper, 26*l.* 5*s.*)

This splendid collection of photographs marks a new departure in the history of the illustration of the ice and snow regions. Hitherto the number of points from which high mountain views have been taken, and the results published, was comparatively limited; certain aspects of certain peaks were again and again produced, while other aspects—perhaps not less striking, though far less known—were wholly or partially neglected. Again, when collections of high mountain photographs were issued in a separate volume, only the most wonderful or the most popular views were given, so that these collections were characterised by a remarkable sameness, the chief difference being in the degree of success attained in reproducing these few chosen views.

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Mr. Eckenstein and Herr Lorria have, however, struck out quite a new line in their remarkable set of photographs, which we sincerely hope may meet with such success as to warrant them in turning their energies to other mountain districts. Their plan is to supply climbers (for it is to them the work chiefly appeals) with a photographic monograph, if we may be allowed the expression, of each of the great peaks included in the range between the Simplon and the Great St Bernard—* a series of views representing it from every possible side, which thus gives an even more exact idea of its topography than the best map ever published. It is obvious that the adoption of this scheme is open to the commonplace criticism that some of the views reproduced are not particularly striking or interesting; but this is a reproach which should rather be addressed to Mother Nature herself than to those who reproduce her various aspects. Thus the plan of the book is not merely (as has hitherto been the case) to offer to the world a set of views of the most magnificent or picturesque aspects of the Higher Alps, but to furnish a set of views giving *all* aspects of the great peaks in the selected district. Such an aim could not be achieved by bringing together the published photographs of professionals, and hence the editors have appealed—and not in vain—to the rapidly increasing class of amateur photographers, who have placed at their disposal a great number of unpublished views taken from unusual points, so that the completeness of the collection is one of its most remarkable features. All the best known amateur photographers have lent their aid, and it is a graceful compliment on the part of the editors to dedicate their work to the most accomplished of all Alpine photographers, Mr. W. F. Donkin, whose sad death is an irreparable loss, at once to his friends and to those who only knew him through his marvellously delicate photographs. But of course so many comparatively untrained persons have attained very different degrees of success, and this accounts for the fact that some of the views in this volume are distinctly poorer than others. An additional reason of this phenomenon is, no doubt, that the views required to complete the monograph of any one peak are not always of recent date, and have not originally been permanently secured by any of the processes which have of late made so rapid and continuous an advance towards perfection.

Thus the two most obvious objections to this work—the want of picturesqueness in the case of certain views, and the technical defects of certain others, added to the different scales of the negatives—bring out better than anything else its real aim and its great merits. It is a treasure for climbers rather than for artists or professional photographers, and as such we cannot sufficiently express our gratitude for it to the editors, who have spent enormous pains and trouble on their enterprise. It is also valuable for scientific purposes, because the precise condition of the glaciers in certain years is now preserved for ever,

* It is not quite accurate to exclude from the term 'Pennine Alps' the district of Mont Blanc, but this may be excused, for it was probably impossible to find any other general name for the range between the Simplon and the Great St. Bernard.

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while its purely topographical value is perhaps even greater than its 'climbing' or its scientific value. The views are 100 in number, reproduced in heliotype, and printed in absolutely permanent ink. Each is printed on thick cardboard, and bears a number referring to the separately printed volume of letterpress in which the names of the photographers and the date at which the view was taken are given, besides a full, if somewhat dry, catalogue of all the peaks, passes, and glaciers seen in that view, the heights (in mètres) being taken from the great Swiss and the new Italian maps (the latter, however, is on a scale of $\frac{1}{100000}$, not $\frac{1}{50000}$ as stated). A useful table for converting mètres into feet is also supplied, but it is to be regretted that the editors did not lay before their readers some account (however compressed) of the climbing history of the district included in their work. The photographs and letterpress are enclosed in a strong red cloth case.

The space at our disposal does not allow us to speak in detail of the several views, nor is it altogether necessary to do so, for it may be confidently assumed that many of our readers will have already seen the work. But at the risk of seeming to pass over many pictures of great merit, we cannot refrain from specifying as those which seem to us the very pick of the lot, numbers 39 and 42 (both by Signor Sella), 54 and 63 (by Mr. Donkin), and 88 (by M. Kurz). Mr. Eckenstein and Herr Lorria are to be heartily congratulated on the success of their bold and admirably executed undertaking.

Hints to Travellers: Scientific and General. Edited for the Council of the Royal Geographical Society by Douglas W. Freshfield and Captain W. J. L. Wharton. Sixth edition, revised and enlarged. (London: Published by the Royal Geographical Society. Crown 8vo. pp. 430. 6*s*.)

A mountaineer is often a traveller, though a traveller is less commonly a mountaineer. Yet of recent years mountaineering has become more and more recognised as not merely a delightful pastime, but a handmaid of geographical science and a useful branch of travel. Hence mountaineers will not be surprised to find that in the sixth edition of the R. G. S.'s standard 'Hints,' their own special department is often mentioned, so that the work contains many useful hints for them as well as for travellers on the plains. The name of one of the joint-editors, who was formerly editor of the 'Alpine Journal,' and is actually one of the hon. secretaries of the R. G. S., is a sufficient guarantee that these hints are both valuable and practical.

Despite the modesty of the preface, this edition is to a very large extent a new work. It contains 430 pages, as against the 296 of the fifth edition, each section having been thoroughly revised, and in every case added to, by the highest authorities. Two new chapters are added—'Preliminary Hints,' by Mr. Freshfield, and 'Industry and Commerce,' by Mr. J. S. Keltie, librarian of the R. G. S. A very full index replaces the old table of contents, and two maps of the northern and southern constellations are substituted for the 'Isochronic Passage Chart.' But the rounded corners of the binding have, rather to our regret, given way to the ordinary shape, though a very handy measuring ruler, marked in

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inches (6) and centimètres (15·4), is printed on the outer cover of the new edition.

The work contains chapters on outfit, medical hints, surveying and astronomical observations, photography, meteorology, geology, natural history, and anthropology, besides the two new ones already mentioned. Mr. Freshfield's hints on mountain travel are admirably clear and helpful, but unluckily fill only a couple of pages, an amount of space which, by the time the next edition is published, the R. G. S. will, we hope, largely increase. 'Icecraft, like seamanship, must be learnt,' is a terse maxim which is too often neglected in practice. We notice, too, that Mr. Freshfield favours the plan of choosing a succession of centres in mountain districts and working from them, rather than staying in one district all the time, or rushing straight from point to point. In the chapter on surveying, &c., nine new tables have been added, among them tables for the conversion of mètres into feet, of kilomètres into miles, and kilogrammes into pounds, whilst No. xxiii. gives the length of time occupied by the post from London to all the principal places on the face of the earth—a most curious and valuable document. Mr. Donkin's chapter on 'Photography' has been rewritten and brought up to date by Captain Abney, while 'Preliminary Hints' contain much that will be valuable to the mountaineer. For example, the following passage sums up what is one of the chief obstacles in the exploration of an unknown mountain district:—'A summit, unless exceptionally conspicuous, has frequently no name apart from the chain or block to which it belongs, or the pass nearest it. A chain or block will get a name from the pasturage on its slope; or it will be called after the valley at its base; or, more frequently, from the valley on the other side reached by crossing it. In the latter case it is obvious that it will probably have two names. As a rule a name given to a *massif*, or group, should be applied to its highest point. For that it is vertical, and not lateral, extension that differentiates mountains, that their essential feature is their height, and that their individuality resides in their highest point, are very modern refinements.' We are glad to find that the R. G. S. holds out the hand of friendship, and not the finger of scorn, towards mountaineers, and it may in return reap no inconsiderable benefit. Certainly the new edition of 'Hints' will do much to help climbers to become geographers as well.

The Adventures of Mr. John Timothy Homespun in Switzerland. Stolen from the French of Tartaron de Tarcascon, aux Alpes. [By Frances Anne Kemble.] (London: Bentley. 8vo. pp. 65.)

All readers of the 'Alpine Journal' know, or ought to know, their 'Tartarin sur les Alpes,' but we cannot give the same recommendation in favour of its English adaptation. Most of the main incidents of the original are borrowed bodily, but much spoiled by the transfer. The new Tartarin is a terrible Cockney, 'Louis des Montagnes' is a very shadowy Bompard, and the love story introduced is very absurd. The narrative is thrown into a dramatic form, with four acts and many scenes, and much wearisome dialogue, and its general character may be guessed from the wretched attempt at humour shown by the inten-

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tional misspelling on the title-page. The authoress has not succeeded in depicting even a typical British Tartarin, a character who is no more unknown in North Britain than in South France.

Guida delle Alpi Occidentali. Da A. E. Martelli e L. Vaccarone. Vol. ii. Alpi Graie e Pennini; Part i. (Turin, 1889. Small 8vo. pp. clv. 275. 5 francs.)

In the 'Alpine Journal' for last May (pp. 335–8) I gave an account of the first volume of the entirely recast second edition of this most valuable guide to the Alps of Piedmont. Towards the end of July the second portion made its appearance, but as the authors found that the materials at their disposal were even more copious than they had anticipated they have wisely divided their second volume into two handy parts, one of which is now issued and the other promised for 1890. (With the latter will be given five coloured maps on a scale of $\frac{1}{100000}$.) The first part describes the three valleys of Lanzo—Viù, Ala, and Grande—as well as the three of the Canavese—Orco, Soana, and Chiusella. The second will describe *all* the lateral glens of the Val d'Aosta, from Cogne to Gressoney, as well as the upper parts of the Sesia and the Ossola valleys and of the Biella district. In other words, the first part includes the frontier chain from the Roche Melon to the Punta di Galisia, as well as the great southern ridge of the Grand Paradis group; while the second will take in the Italian side of the main chain from the Galisia to the Gries Pass—that is, roughly speaking, the Italian slope of the Mont Blanc and Monte Rosa groups, with various minor ranges. I must, however, say that it seems to me that this second part, covering such an enormous extent of country, will have to be followed by a third, unless (which would be very much to be regretted) the descriptions are ruthlessly shortened.

Speaking with all respect for the great knowledge of the authors, I cannot help expressing my opinion that a less logical division would have been far more convenient for those who will use this excellent work. At present the bit of the Paradis district between the Grand Paradis itself and the Punta Lavina appears in part i., while the rest of that district will appear many pages off and quite isolated, as belonging to one of the lateral glens of the Aosta valley. It would have been far more convenient, I think, to have tacked on to the Lanzo valleys the descriptions of the deep-cut glens between the Val Savaranche and the Little St. Bernard (the Val de Rhèmes and the Val Grisanche), while reserving the Val Savaranche and Val d'Orco (with its side glens to the north) for part ii., so that the *whole* of the Grand Paradis group might have been described continuously and in one section.

Again, in the book as it now stands there is a certain amount of rather useless repetition, for the passes leading from one valley to another, and many peaks, are sometimes described *twice*—once in the section devoted to each valley. It is true that the second description is often shorter than the first, but in many cases a full description once for all, to which a simple reference back in other sections might have been made, would have met the necessities of the case. As before the passes and

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peaks are grouped together in successive divisions of the same section.

So much for the general arrangement of the book. I must now speak of the text of this first part of vol. ii.

Nearly 150 preliminary pages are taken up with two important subjects. The first of these is the bibliography of, the second the list of first ascents made in, the Graian and Pennine Alps, serving thus as the introduction to both parts of vol. ii. The former section is pretty nearly exhaustive, and shows most extensive knowledge of Alpine literature. Mr. Dent's 'Above the Snow-Line,' Professor Tyndall's 'Hours of Exercise in the Alps,' and the first series of 'Peaks, Passes, and Glaciers' (French translation) have by some mistake found their way into the Graian bit instead of the Pennine bit, to which they properly belong. On the other hand, the second series of the latter work is completely ignored in the Graian section. In the Pennine bit two at least of the articles in 'Peaks, Passes, and Glaciers' (each of which is generally indicated with care) have been omitted—Mr. Davies' 'First Ascent of the Dom' and Mr. Ames' 'Laquinhorn'—while Professor Forbes' smaller work of 1855 is quoted in preference to the larger one ('Travels in the Alps of Savoy,' 1843), of which the former is a mere extract. Mr. Whymper's book is quoted in the 1880 edition only. Only one of C. M. Engelhardt's works (that of 1852) is mentioned, and Desor's 'Excursions et Séjours sur les Glaciers' is omitted. But these are comparatively trifling omissions, and the bibliography as a whole is a monument of industry and exactness, though there are a number of small misprints in the names of certain foreign persons and places.

The table of first ascents is full and accurate, if I may be allowed to say so after having revised it in proof; but, as in the case of vol. i., I regret that a slightly different method of arrangement was not adopted. The authors too should be more careful in seeing that *all* the routes mentioned in the table are rightly described in the text and *vice versâ*. This is not always the case, for Mr. Yeld's Col de Cerru * appears all right in the table, but is described in the text only as a way up the Punta di Galisia; and this is by no means the only instance. Signor Corra's descent of the entire W. wall of the Eastern Levanna † is omitted both in the table and in the text.

Of the text itself I can speak in the highest terms as regards its fulness, its accuracy, and its extreme value. In particular the matter contained in Signor Vaccarone's 'Bollettino' articles on the ridges at the head of the Val Grande is here carefully sorted out and rendered available for travellers. I wish that Signor Vaccarone had gone behind the figures given on the Italian map to the various points on the complicated ridge between the Passo del Collerin and the Piccola Ciamarella, for they are certainly wrong, possibly misprints. The ridge itself is quite accurately described, save that the descent, on the French side, from the Col de Chalanson has not yet been effected,

* *Alpine Journal*, vol. ix. p. 100.

† See M. Levasseur's *Les Alpes*, p. 116.

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by reason of dangerous overhanging séracs, so that it would have been wiser to mention this fact. But this is a mere nothing to set against the vast amount of valuable and detailed information concerning little-known ranges to be found in this work, which promises very well for the second part, since the ranges round the Italian valleys of Rhèmes, Grisanche, and Valpellina, excepting of course certain great peaks, have received as yet but a small part of the attention they merit.

A very full and useful index is added to this part, and shows that the authors have spared no pains or trouble in drawing up their most elaborate and remarkable description of the Piedmontese Alps from the Col de Tenda to the Gries Pass. Their work will always remain a great monument of Alpine enterprise and research, and the Turin section of the Italian Alpine Club has done well in undertaking its publication. W. A. B. Coolidge.

Guide du Touriste en Savoie. Par Alfred Weissen. (Geneva: H. Georg. Small 8vo. pp. 388. 5 francs.)

The chief merit of this odd little work is that it describes both departments into which Savoy is now divided, and which are generally cut asunder by guide-book makers. Its scheme is not ill conceived, but the manner in which it has been worked out cannot be commended. The book is divided into three sections, which respectively describe the approaches to Savoy from Switzerland, from France, and from Italy, together with the particular Savoyard valleys which lie near these three frontiers. We are thus made to realise that Savoy occupies the position of a 'buffer' on a small scale, as Switzerland does on a larger one. The pagination is continuous, but the numbering of the routes is very inconveniently begun over again in each section. M. Weissen announces on his title page that he is 'membre du Club Alpin' (understand most probably 'Français,' perhaps 'Suisse'), and in his preface thanks the presidents of the different sections of the 'Club Alpin des deux départements.' But this must not be taken to imply that his guide is meant for mountaineers, for, as indeed the title page shows, it is primarily intended for 'touristes' So far as the ice and snow region is concerned, M. Weissen says but little. At Chamonix Mont Blanc, the Dôme and the Aiguille du Goûter, the Buet, and the Jardin are the only 'courses extraordinaires' even hinted at. The glacier passes leading over to Chamonix from Italy are (save the Géant) barely alluded to, while those from Italy to the Maurienne and the Tarentaise are indeed enumerated, but described shortly, vaguely, and often not correctly, though each is said to exceed the other in point of danger and difficulty. The mere mistakes in the text generally are numerous and serious. The unfortunate statement that from the Col de Balme 'les splendides montagnes de l'Oberland berlinois' are to be seen is indeed corrected in the Errata; but the Col de l'Infernet is mixed up with the Col de l'Agnelin, as is the Col de Martignare with the Col Lombard, for the route to each of these four passes on the Dauphiné side is absolutely and entirely distinct. We are told that the Pointe de Ronce is 'environnée des glaciers de Tignes,' though the peak overhangs the Mont Cenis and the village

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is far away across a broad valley and behind a dense mass of mountains. The accounts of the Col d'Ambin and the Col de Collerin are blood-freezing, though really they are not more difficult than the St. Théodule. The Pointe du Vallonet and the Pointe de la Glière are no longer virgin, for they were climbed some years ago and accounts of the climbs published. Nor is the author more fortunate when describing highroads and well-known mule tracks, for in one passage he tells us that it takes '10 hours' to go from Bramans to Modane, though the distance is really under 11 kilomètres, or nearly 7 miles, while in another we are informed that a 'marcheur exercé' will go from Modane to Bourg St. Maurice in one day by the Col d'Iseran, though the distance between those two places is made out to be no less than 189 kilomètres, or 117⅓ miles, for Modane is 93 kilomètres from Lanslebourg! It is only necessary to add that from Modane to Lanslebourg by the great Mont Cenis road is only 26 kilomètres, and that thence to Bourg St. Maurice is, according to M. Weissen himself in his wiser moments, 66 more, or 92 in all (57¼ miles); but in either case we are curious to hear in what time M. Weissen himself has traversed this distance. Possibly the descriptions of the lower passes and rambles in the Chablais and Faucigny may be useful to tourists, but enough has been said to show that for mountaineers the book is worse than useless.

We regret to learn that the French Government declined to allow M. Weissen to publish extracts from the 'Carte Vicinale' ($\frac{1}{100000}$), but when he says that the map he adopted finally (that of A. Perrin, of Chambéry), though 'inférieure aux précédentes, est toutefois assez bonne et exacte,' we beg respectfully to differ from him. The six small maps are nearly illegible and are quite useless for the pedestrian. The large map ($\frac{1}{320000}$) is perhaps rather clearer, but unblushingly announces the existence of the 'Mont Iseran, 4,046 mètres,' a gross error which shows that it must have been made thirty years ago; though we hasten to say that it is an error of which there is no trace in the text itself.

At the end of the book there is a convenient alphabetical table of the passes mentioned, with the names of the places from one to another of which they lead, references to the pages on which descriptions of each pass will be found, with heights and times required to cross them, but the estimate of the difficulty of each is often very far from the mark. There are also tables of the hours of departure of the 'diligences' traversing Savoy, and of the steamers on the Lac d'Annecy.

The book as a whole is well-meant, and shows a certain amount of industry in the author, but its mistakes, of which we have given a few specimens, may not improbably hinder it from attaining a second edition, though it is proudly announced on the title page that this is the 'première édition.'

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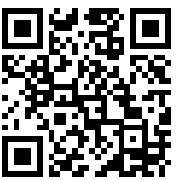
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